Foreword

Thank you for purchasing VF5000 series high capacity vector control inverter from our company Pioneer Electronics CO., LTD.

VF5000 series can fulfill all kinds of demand for general-purpose inverter by advanced control manner which make high torque, high precision and wide-range speed regulation drive be available. VF5000 is organic combine of customer's general need and industrial requirement to provide practical PI adjuster, simple PLC, programmable input output terminal control, long-distance synchronous control, impulse frequency provision and other special inverter control with powerful function for customer and to provide highly-integrated incorporative solution of high value for reducing system cost and improving system reliability for device manufacturing and automation engineering customers.

VF5000's big torque low noise and low electromagnetic disturbance during operation can fulfill customer's environmental protection requirement by space voltage vector control technology and electromagnetic compatibility unitary design.

Assembling wiring, parameter setting, troubleshooting and daily maintenance notice are available in this manual. To make sure that you can correctly assemble and operate VF5000 series inverters to exert their excellent performance, please read this user manual detailedly before you assemble the device and conserve the manual appropriately before the end-user get them.

Please contact our office or dealer in all places at any moment if you have any doubts or special demands when using these inverters, and you can also contact our after service center in our Headquarters directly. We will serve you with all our heart.

We reserve our right to notice you if we change contents or this manual.

Contents

1 Summary

1.1 Confirmation of product----------（4）
1.2 Safety attentions----------（5）
1.3 Use attentions ----------（7）
1.4 Rejection attentions----------（8）

2 Product specification and order notification

2.1 Inverter series model----------（9）
2.2 Specifications----------（10）
2.3 Outline size----------（12）
2.4 Option----------（17）

3 Installation and wiring of inverter

3.1 Installation environment of inverter----------（19）
3.2 Disassembling and installing of inverter keypad----------（20）
3.3 Attentions of inverter wiring----------（20）
3.4 Wiring of main circuit terminal----------（21）
3.5 Diagram of wiring for basic running----------（24）
3.6 Control circuit configuration and wiring----------（25）
3.7 Installation guide in line with EMC requirement----------（28）

4 Running and operation of inverter

4.1 Running of inverter----------（31）
4.2 Operation and using of keypad----------（32）

5 Specification of function parameter table

5.1 Basic parameter:(F0.00－F0.23)----------（40）
5.2 Motor and vector control parameter group:(F1.00－F1.15)----------（45）
5.3 Auxiliary parameter group:(F2.00－F2.43)----------（47）
5.4 User's management parameter group:(F3.00－F3.09)----------（54）
5.5 Digital input and output parameter group:(F4.00－F4.16)----------（56）
5.6 Analog input output parameter group:(F5.00－F5.16)----------（61）
5.7 PID control parameter group:(F6.00－F6.14)----------（65）
5.8 Programmable running parameter group:(F7.00－F7.18)----------（67）
5.9 Communication parameter group:(F8.00－F8.04)----------（70）
5.10 Protection function parameter:(F9.00－F9.03)----------（72）
5.11 Advanced function parameter:(FA.00－FA.12)----------（72）

6 Function parameter table

6.1 Function parameter schedule graph(F0.00－FA.12)----------（74）

6.2 Supervision function(D-00－D-28)----------（87）
7 Troubleshooting
7.1 Failure and countermeasure----------（89）
7.2 Enquiry of fault record----------（91）
7.3 Fault reset----------（91）
8 Maintenance
8.1 Maintenance----------（92）
8.2 Regular inspection----------（92）
8.3 Warranty of inverter----------（93）

1 Summary

1.1 Confirmation of product

After uppacking, please check whether the inverter is scratched or damaged in course of carrying, and whether the rated value on the nameplate is in line with your order requirement.

If finding any problems, please contact supplier or us.

Model description：

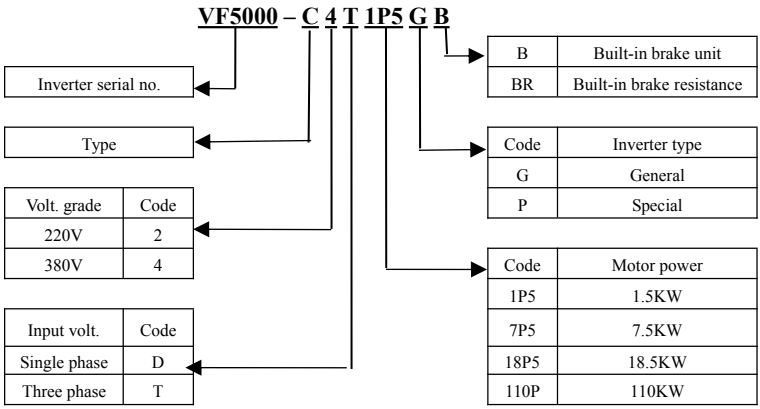


Fig.1-1 Model description

There is a nameplate with inverter model and rated value stuck on the lower part of right plate of inverter case, the information in it as follows:

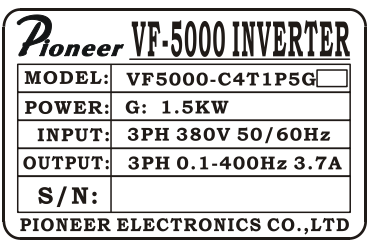


Fig. 1-2 Nameplate of inverter

1.2 Safety attentions

- **RECEIVING**

CAUTION

1. Do not install or operate any inverter which is damaged or has missing parts.
Failure to observe this caution may result in personal injury or equipment damage.

- **INSTALLATION**

CAUTION

1. Lift the cabinet by the base. When moving the unit, never lift by the front vover.
Otherwise, the main unit may be dropped causing damage to the unit.
2. Mount the inverter on nonflammable material.
Failure to observe this caution can result in a fire.
3. When mounting units in an enclosure, install a fan or other colling device to keep the intake air temperature below 45℃.
Overheating may cause a fire or damage to the unit.

- **WIRING**

WARNING

1. Only commence wiring after verifying that the power supply is turned OFF
Failure to observe this warning can result in an electrical shock or a fire.
2. Wiring should be performed only by qralified personnel.
Failure to observe this warning can result in an electrical shock or a fire.
3. When wiring the emergency stop circuit, check the wiring

thoroughly before operation.
Failure to observe this warning can result in personal injury**.**

CAUTION

1. Verify that the inverter rated voltage coincides with the AC power supply voltage.
Failure to observe this canution can result in personal injury or a fire.
2. Do not perform a withstand voltage test of the inverter.
It may cause semi-conductor elements to be damaged.
3. Tighten terminal screws to the specified tightening torque.
Failure to observe this caution can result in a fire.
4. Never connect the AC main circuit power supply to output terminals U, V and W.
The inverter will be damaged and invalidate the guarantee.

- **OPERATION**

CAUTION

1. Never touch the heatsink or discharging resistor since the temperature is very high.
Failure to observe this caution can result in harmful burns to the body.
2. Since it is easy to change operation speed from low to high speed, verify the safe working range of the motor and machine befor operation.
Failure to observe this caution can result in personal injury and machine damage.
3. Install a holding brake separately if necessary.
Failure to observe this caution can result in personal injury.

- **MAINTENANCE AND INSPECTION**

WARNING

1. Never touch high-voltage termainals in the inverter.
Failure to observe this warning can result in an electrical shock.
2. Replace all protective covers before powering up the inverter. To remove the cover, make sure to shut OFF the molded-case circuit breaker.
Failure to observe this warning can result in an electrical shock.
3. Perform maintenance or inspection only after verifying that the CHARGE LED goes OFF, after the main circuit power supply is turned OFF.
The capacitors are still charged and can be dangerous.
4. Only authorized personnel should be permitted to perform maintenance, inspections or parts replacement.
[Remove all metal objects (watches, bracelets, etc.) before operation]
Failure to observe this warning can result in an electrical shock.

CAUTION

1. The control PC board employs CMOS ICs. Do not touch the CMOS elements.
They are easily damaged by static electricity.
2. Do not control or disconnect wires or connectors while power is applied to the circuit.
Failure to observe this warning can result in personal injury.

1.3 Use attentions

Please pay attention following points when using VF5000.

1. VF5000 series inverter is voltage-type inverter, so temperature, noise and vibration slightly increasing compared to power source running when using, belongs to normal phenomenon.

2. If need to run for a long time with constant torque of low-speed, must select motor of frequency conversion for use. Use general asynchronous AC motor when running at a low speed, should control temperature of the motor or carry on heat

dissipation measure forcedly, so as not to burn the generator.
3. Such mechanical device needing lubricating as the gearbox and gear wheel, etc., after running at a low speed for a long time, may be damaged as lubrication result become poor, please take necessary measure in advance.
4. When the motor running with frequency above specified, besides considering the vibration, noise increase of the motor, must also confirm speed range of the motor bearing and the mechanical device.
5. Fof hoist and great inertia load, etc., the inverter would shut off firequentl due to over-current or over-voltage failure, in order to guarantee normal work, should consider choosing proper brake package.
6. Should switch on/off the inverter through terminal or other normal order channels. It is prohibited that switch on/off the inverter frequently by using shrong electric switch such as magnetic control conductor, otherwise will cause the equipment to be damaged.
7. If need to install such switch as the magnetic control conduct, etc., between inverter output and the motor, please guarantee the inverter is switched on/off without output, otherwise may damage the inverter.
8. The inverter may meet with mechanical resonance of the load within certain range of frequency output, can set up jumping frequency to evade.
9. Before using, should confirm the voltage of the power is within the working voltage range allowed, otherwise should vary voltage or order special inverter.
10. In the condition of altitude above 1000meters, should use the inverter in lower volume, reduce output current by 10% of specified current after each 1500meters height increasing.
11. Should make insulation check to the motor before using it for the first time or after a long time placement.
12. To forbid assembling capacitor for improving power factor or lightningproof voltage-sensible resistance etc., otherwise will cause malfunction trip of the inverter or damage of the parts.

1.4 Rejection attentions

When disposing scrap inverter and its parts, please note:
1. The unit: please discard as industrial useless.
2. Electrolytic capacitor: when burning the inverter electrolytic capacitor in it may explode.
3. Plastic: when plastic, rubber parts etc. in the inverter are burning , they may bring bad, poisonous gas, so please be ready to safeguards.

2 Product specification and order notification

2.1 Inverter series model

VF5000 series inverter has two voltage classes: 220V and 380V. The applicable motor power range is 0.75KW~315KW. VF5000 series inverter model is shown as table2-1.

Table 2-1 Model of VF5000 series inverter

Voltage class	Model	Rated power （KVA）	Rate output current（A）	Adapted motor （KW）
380V	VF5000-C4T0P7G	1.5	2.1	0.75
	VF5000-C4T1P5G	3.7	3.7	1.5
	VF5000-C4T2P2G	4.7	5.0	2.2
	VF5000-C4T4P0G	6.1	8.8	4.0
	VF5000-C4T5P5G	11	12.0	5.5
	VF5000-C4T7P5G/P	14	16.0	7.5
	VF5000-C4T11PG/P	21	23.0	11
	VF5000-C4T15PG/P	26	31.0	15
	VF5000-C4T18P5G/P	31	36.0	18.5
	VF5000-C4T22PG/P	37	43.0	22
	VF5000-C4T30PG/P	50	58.0	30
	VF5000-C4T37PG/P	61	70.0	37
	VF5000-C4T45PG/P	73	85.0	45
	VF5000-C4T55PG/P	98	103.0	55
	VF5000-C4T75PG/P	130	145.0	75
	VF5000-C4T90PG/P	170	170.0	90
	VF5000-C4T110PG/P	138	201.0	110
	VF5000-C4T132PG/P	167	240.0	132
	VF5000-C4T160PG/P	230	305.0	160
	VF5000-C4T200PG/P	250	380.0	200
	VF5000-C4T220PG/P	280	415.0	220
	VF5000-C4T245PG/P	340	475.0	245
	VF5000-C4T280PG/P	450	505.0	280
	VF5000-C4T315PG/P	460	580	315
220V	VF5000-C2D0P7G	1.4	4.5	0.75
	VF5000-C2D1P5G	2.6	7.0	1.5

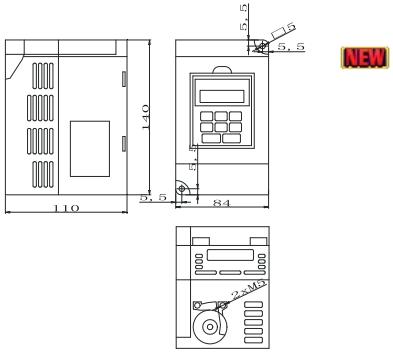
	VF5000-C2D2P2G	3.8	10.0	2.2

2.2 Specifications

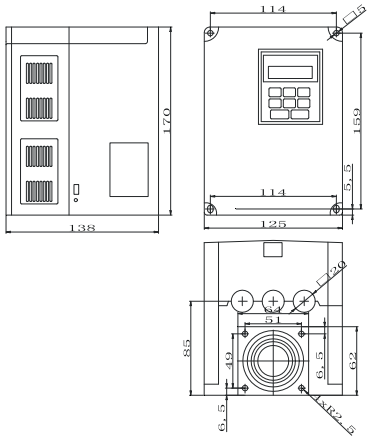
Item		Item description
Input	Rating volt. frequency	Single phase 220V、3 phase 220V、3 phase 380V；50Hz/60Hz
	Variable allowable value	Voltage：-20% ～ +20％ Voltage unbalance：<3% Frequency：±5％
Output	Voltage	0～220V/0～380V
	Frequency	0Hz～400Hz
	Overload capacity	150% 1min，180% 1s，200% instant protection；
Main control function	Control mode	Space voltage vector PWM control (With superior low-frequency dead zone compensation characteristic)
	Frequency precision	Digital setting：Max frequency×±0. 01%； analog setting：Max frequency×±0.2%
	Frequency resolution	Digital setting：0.01Hz；analog setting：Max frequency×0.1%
	Start-up frequency	0.0Hz～10.00Hz
	Torque boost	Automatic torque boost，manual torque boost1%～30.0%
	V/F curve	Three ways: line V/F cruve, square V/F curve, user self-defining V/F curve.
	Acceleration/deceleration time	Optional time unit (Min/s), max 3600s（0.1～3600s）
	DC braking	Optional start-up and stop, action frequency0～20Hz，action volt. 0～20%，action time 0～30s
	Jog	Jog frequency range：0.1Hz～50.00Hz,jog accelerating decelerating time 0.1～3600s
	Interior PID	Be convenient to make closed-loop system.
	Multi-speed running	Realized by interior PLC or control terminal
	Weaving traverse frequency	Can get traverse frequency of adjustable central frequency.
	Automatic voltage regulation	Can keep constant output voltage when power source voltage varies.
	Automatic energy save running	Optimize V/F curve automatically based on the load to realize power save running.
	Automatic current limiting	Limit running cuttent automatically to avoid frequent over-cuttent which will cause trip

Running	Running command passage	Setting of operating manual; setting of control terminal; setting of serial port; switching by three ways.
	Frequency setting passage	Setting of keypad analog potentiometer; setting of keypad▲、▼keys. Setting of functional code digits. Setting of serial port, setting of terminal UP/DOWN, setting of analog voltage, setting of analog current; settting of impulse, setting of combination; switching at any time by kinds of settting ways.
	Switch input passage	Forward/reverse rotating command, 6-way programmable switching value input to set 21 functions.
	Analog input passage	2-way analog signal input，0～20mA、0～10V optional.
	Analog output channel	Analog signal output 0～10V to get output of physical quantity like frequency and output frequency.
	Switch output passage	2-way programmable open collector output; 1-way relay output signal, to get output of different physical quantities.
Keypad	LED display	Can display setting frequency、output voltage、output current etc.
	Display external instrument	Display output frequency, output current, and output voltage and so on.
Protection function		Over cuttent protection, over voltage protection, under voltage, over-heat protection, over-load protection, missing phase protection (in option) etc.
Option		Brake subassembly, remote-control keypad, connecting cable for remote-control keypad etc.
Environment	Use ambient	Indoor, not bare to sunlight, no dust, no corrosive gas, no flammable gas, no oil fog, no vapor, no water drop or salt etc.
	Altitude	Lower than 1000m
	Temperature	－10℃～＋40℃
	Humidity	Smaller than 90%RH，no condensation water
	Vibration	Smaller than 5.9m/s^2
	Storage temperature	－20℃～＋60℃
Structure	Defending frade	IP20
	Cooling mode	By fan
Mountion mode		Wall hanging

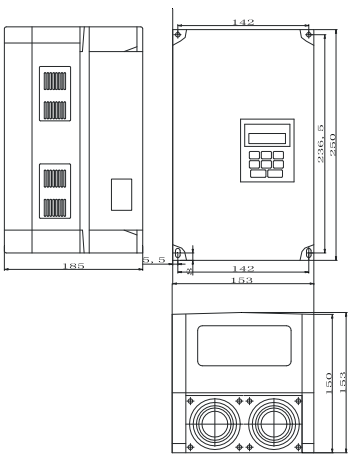
2.3 Outline size VF2100/VF3000/VF5000（unit:mm）



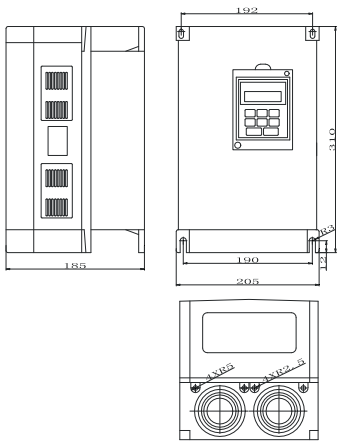
（a）：0.4KW～1.5KW-M size



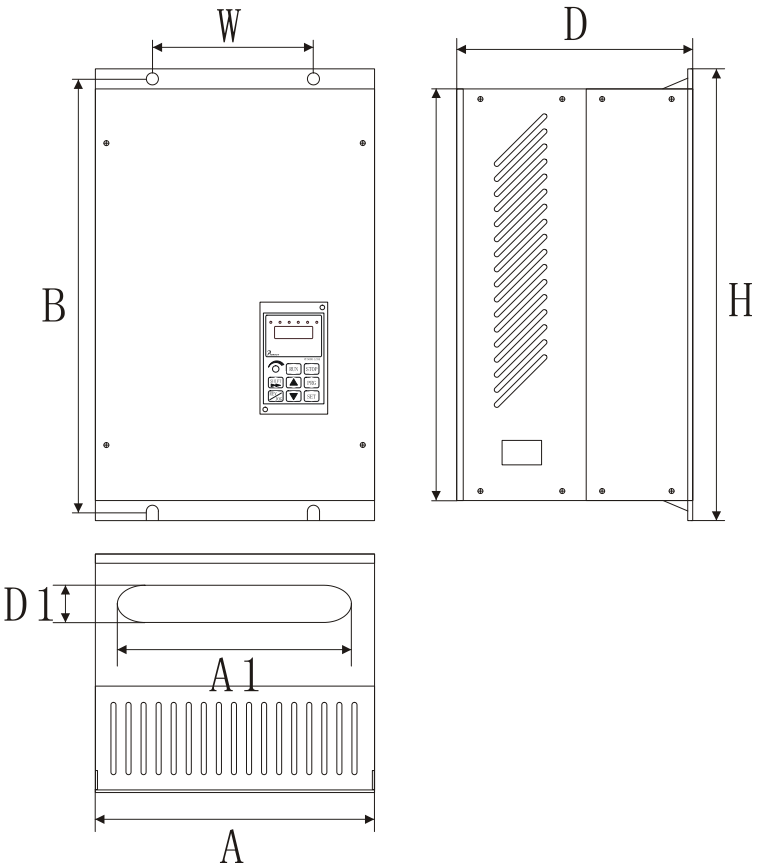
(b)：0.75KW-2.2KW size



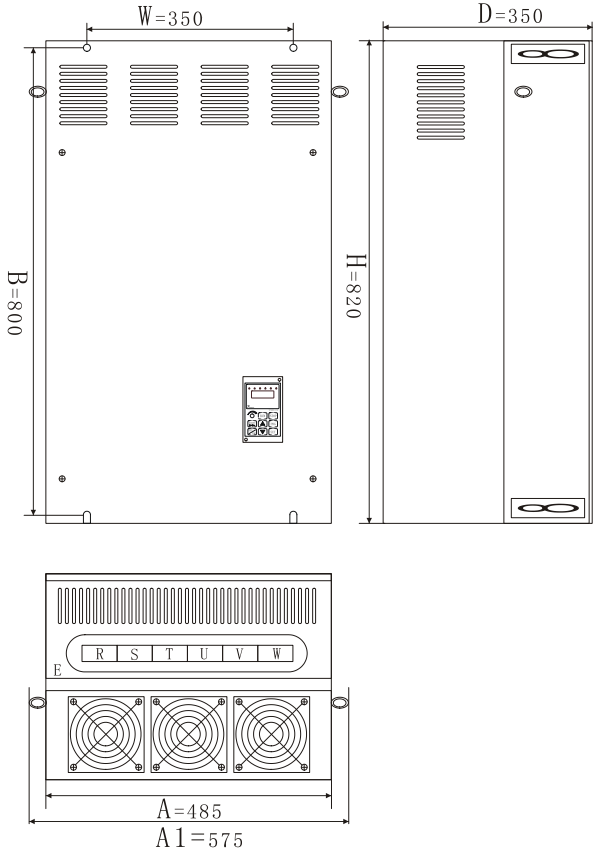
(c)：4.0KW-5.5KW size



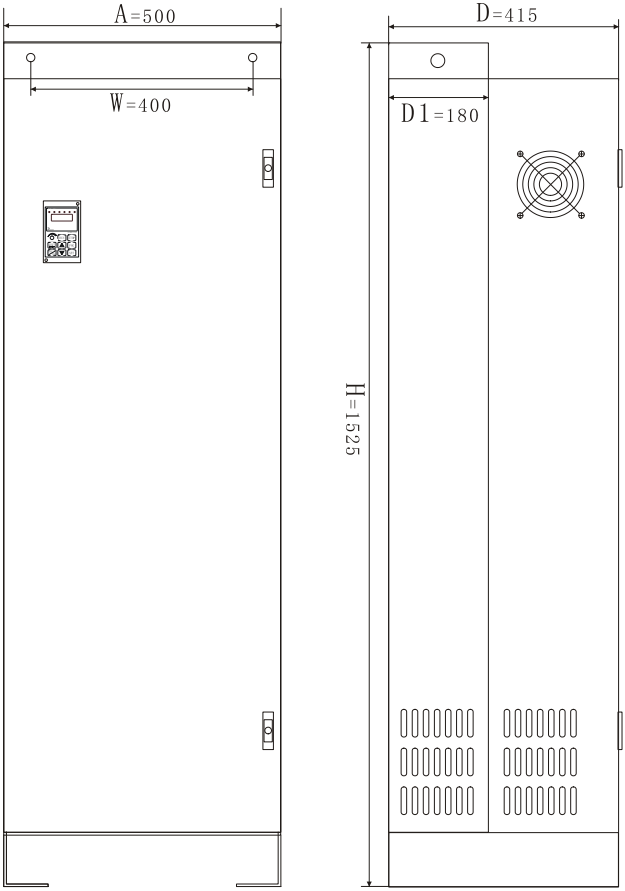
（d）：7.5KW～15KW size



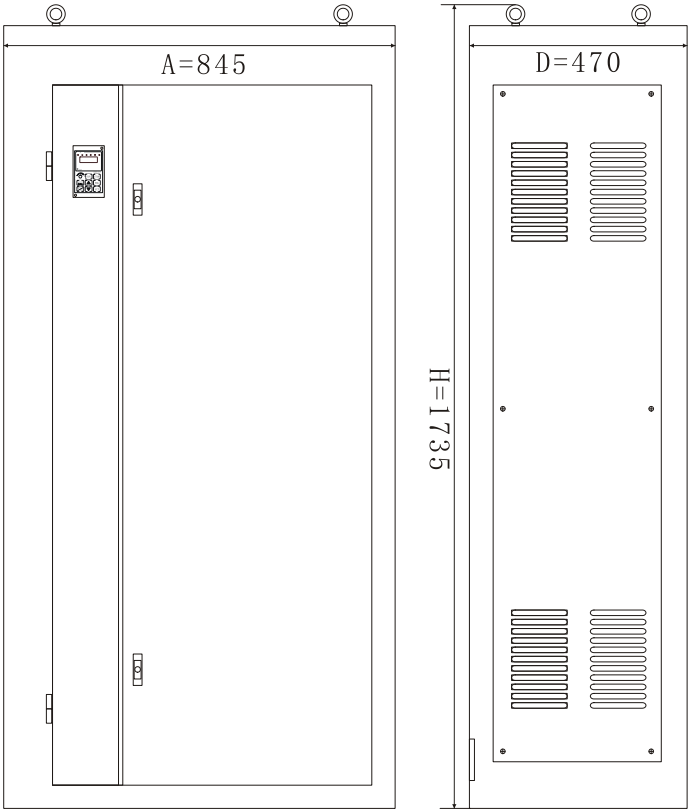
（e）：18.5KW～75kW



（f）：90KW～150KW



(g)：160KW～200KW

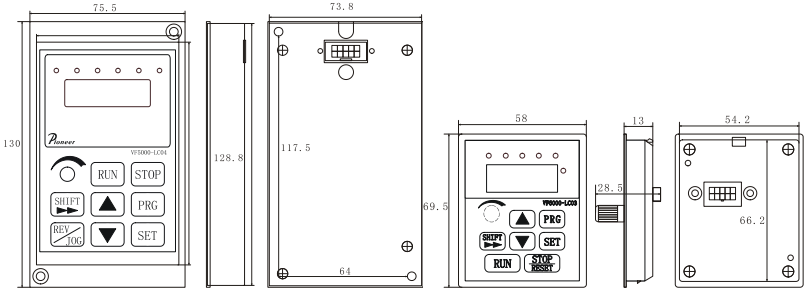


(h)：220KW～315KW

Table 2-2 inverter outline & installation size

Type	H	A	A1	D	D1	B	W
VF5000M-C4T0P7G	140	84		110		129	73
VF5000M-C4T1P5G							
VF5000-C4T0P7G	170	125		138		159	114
VF5000-C4T1P5G							
VF5000-C4T2P2G							
VF5000-C4T4P0G	250	153		185		236.5	142
VF5000-C4T5P5G							

VF5000-C4T7P5G/P	310	205		185		300	192
VF5000-C4T11PG/P							
VF5000-C4T15PG/P							
VF5000-C4T18P5G/P	450	280	201	235	40	435	160
VF5000-C4T22PG/P							
VF5000-C4T30PG/P	575	335	220	250	40	555	180
VF5000-C4T37PG/P							
VF5000-C4T45PG/P	615	375	270	265	40	595	230
VF5000-C4T55PG/P							
VF5000-C4T75PG/P	720	410	258	310	40	705	260
VF5000-C4T90PG/P	820	485		350		800	345
VF5000-C4T110PG/P							
VF5000-C4T132PG/P							
VF5000-C4T150PG/P	1525	500		415			400
VF5000-C4T160PG/P							
VF5000-C4T185PG/P							
VF5000-C4T200PG/P							
VF5000-C4T220PG/P	1735	845		470			
VF5000-C4T250PG/P							
VF5000-C4T280PG/P							
VF5000-C4T315PG/P							



VF5000-LC04/LC03 outer size **VF5000-LC04/LC03 hole size**

Table 2-3 Remote-control keypad size

2.4 Option: following options please order separately.

2.4.1 Remote-control keypad

Between VF5000 inverter and its remote-control keypad are provided with RS485

communication way and connected by one 10-core network cable, the connection of port is provided with RJ45 network interface connection, it is very convenient to install. The max electric distance can reach as high as 500m.

The remote-control keypad has following functions:

1. Can control the running, stopping, jogging, fault resetting, change of setting frequency, change of function parameter and running direction of slave.
2. Can monitor operating frequency, setting frequency, output voltage, output current and so on.

2.4.2 Communication cable

Communication cable of remote-control keypad

Model: VF5000-LAN0020 (2.0m)

Among the specifications, 1m, 2m, 5m, 10m and 20m are our inverter standard configuration, if need over 20m, user can contact us.

Be used for connection between remote operating keypad and master of inverter.

2.4.2 Braking resistor

VF5000 series inverter braking unit is option, if need, please indicate clearly when ordering. Energy-consumption braking resistor is provided as shown in table2-4.

Table 2-4 Selectable table of braking resistor

Model No.	Applicable motor Power（KW）	Resistor Resistance(Ω)	Resistor Power （W）
VF5000-C4T0P7G	0.75	400	100
VF5000-C4T1P5G	1.5	300	200
VF5000-C4T2P2G	2.2	200	200
VF5000-C4T4P0G	4.0	150	400
VF5000-C4T5P5G	5.5	100	500
VF5000-C47P5G	7.5	75	600
VF5000-C4T11PG	11	60	800
VF5000-C4T15PG	15	45	1200
VF5000-C4T18P5G	18.5	38	1500
VF5000-C422PG	22	34	1500
VF5000-C4T30PG	30	25	2500
VF5000-C4T37PG	37	18	3000

3 Installation and wiring of inverter

3.1 installation environment of inverter

3.11 installation environment condition

1. The inverter shall be installed indoors of perfect ventilation, and the environment temperature shall be in the range of -10℃～40℃,in case that temperature exceeds 40℃,the external air-blast cooling or derating shall be used.
2. Avoid being installed in the location where suffers from the sun, dust, floatation fiber and metallic powder.
3. Never to be installed in the location where corrosive and explosive gas has.
4. The humidity shall be lower than 95%RH, no condensation.
5. The inverter had better be kept far sway the electromagnetic interference device.

3.12 installation direction and space

1. Shall be installed vertically usually.
2. The installation space and min distance are shown as diagram 3-1.
3. As is shown in diagram 3-2, there shall be a baffler mounted among them, when several inverters are installed vertically.

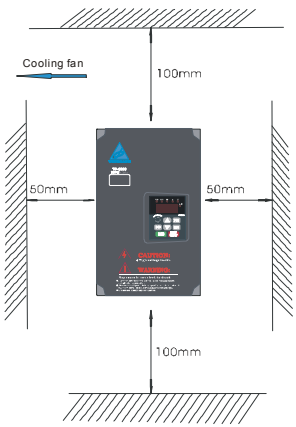


Diagram 3-1 Installation space

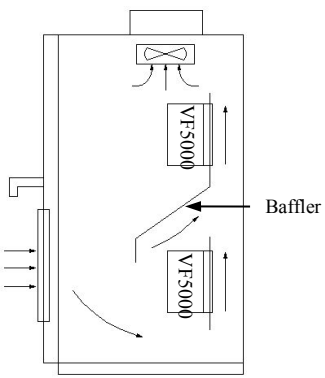


Diagram 3-2 Installation of multi inverters

3.2 Disassembling and installing of inverter keypad

Disassemble: Remove two screws on the side of connection terminal with the cross screwdriver, i.e., the enclosure can be disassembled.

Install: Align the mounting screw, and then mount the screw.

3.3 Attentions of wiring

CAUTION

(1) Before connecting, make sure the power supply has been cut off for more than 10min, otherwise, there would be electric shock danger.
(2) Never to connect the power line to output terminals U, V, W of inverter.
(3) Because there is leakage current in the inverter, the inverter and motor must be grounded safely, the grounding wire shall be copper conductor of more than 3.5mm², and the grounding resistance shall be less than 10Ω.
(4) User shall not conduct the withstand voltage test for the inverter as it has passed this test before leaving factory.
(5) Between inverter and motor shall not be installed with the electromagnetic contactor and absorbing capacitor or other resistance-capacitance absorbing implements as diagram 3-3.
(6) To take the convenience for over current protection of input side and power failure maintenance, the inverter shall be connected to power supply through intermediate breaker.
(7) The connecting wire(X1~X6、D01、A0V)of input and output circuit of relay shall be the stranded wire or shielded wire of over 0.75mm², one end of shielded layer shall be hung in the air, and the other is connected with the earthing terminal E of inverter, the connecting wire shall be less than 50m.

DANGER

(1) Make sure the power supply of inverter has been cut off thoroughly, all LED lamps of keyboard has went out, and wait for more than 10min,can perform the wiring operation.
(2) Make sure that DC voltage between main circuit terminals P+ and N- of inverter steps down to DC36V below, till now, start to perform the wiring

operation.

(3) Only the qualified professional who has been trained and authorized can perform the wiring operation.

(4) Please pay attention that before energizing, check whether the voltage class of inverter is identical with the supply voltage, otherwise, it would result in person casualty and damage of device.

3.4 Wiring of main circuit terminal

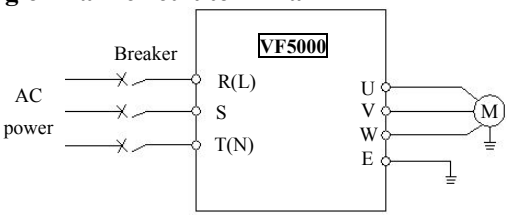
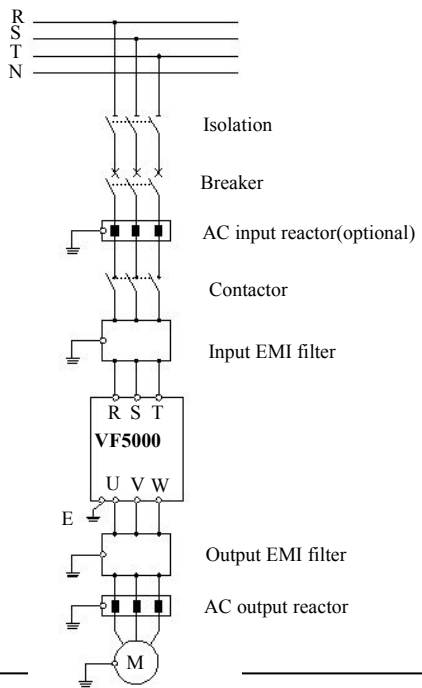


Diagram3-3 Simple wiring of main circuit

3.4.1 Connection of inverter and option

1. Between power grid and inverter, breaking equipment like isolating switch shall be installed for human safety and compulsive power cutting during maintaining the device.
2. The supply circuit of inverter must be mounted with the fuse or circuit breaker with over current protection, to avoid the spread of fault.
3. When the power supply quality of power grid is not quite high, an AC input reactor shall be mounted additionally. The AC reactor also can improve the power factor of input side.
4. The contactor is only for control of power supply.
5. EMI filter on the input side
   The EMI filter can be used to prevent High-frequency conductivity interference And radio-frequency interference from the inverter power line.



6. EMI filter on the output side

The EMI filter can be used to preventradio-frequency interference noise from output side of inverter and leakage current from conductor.

7) AC output reactor

When the wire connecting inverter to motor is more than 50m, AC output reactor had better be mounted the leakage current and prolong the service life of motor. When installing, please consider the voltage drop problem of AC output reactor; or the input/output voltage of inverter is stepped up or the motor is derated to protect the motor.

8. Safe grounding wire

The inverter and motor must be earthed separately for safety as there is leakage current in the inverter; the grounding resistance shall be less than 10Ω.The grounding wire shall be as short as possible, and its diameter shall be in line with the standard given in table 3-1.

(Only two kinds of conductors are provided with the same metal, the value table can be correct, if not, the sectional area of protective conductor is determined with the equivalent conductive factor method and referred to table 3-1.)

Table 3-1 Sectional area of protective conductor

Corresponding conductor sectional area（mm^2）	Min sectional area of corresponding grounding conductor （mm^2）
$S \leq 16$	S
$16 < S \leq 35$	16
$35 < S$	S/2

3.4.2 Wiring of main circuit terminal

1. Input/output terminal of main circuit shown as table 3-2

Table 3-2 Description of input/output terminal

Applicable machine	Terminal of main circuit	Terminal name	Function description
VF5000-C2D0P7G ~		L、N	Single phase AC 220V input
		U、V、W	Three-phase AC 380V output

VF5000-C2D2P2G		B1、B2	Braking resistor
VF5000-C4T0P7G VF5000-C4T15PG		R、S、T	Three-phase AC 380V output
		U、V、W	Three-phase AC 380V output
		B1、B2	Braking resistor
VF5000-C4T18P5G/P~ VF5000-C4T185P G/P		R、S、T	Three-phase AC 380V input
		U、V、W	Three-phase AC 380V output
		+、-	Braking resistor
		E	Earthing terminal
VF5000-C4T200P G/P VF5000-C4T315P G/P		R、S、T	Three-phase AC 380V input
		U、V、W	Three-phase AC 380V output
		E	Earthing terminal

2. The specification of Main circuit cable date, inlet protective circuit breaker QF of fuse as follows:

Type	Breaker（A）	Fuse（A）	Input wire（mm^2）	Output wire（mm^2）	Control wire（mm^2）
VF5000-C4T0P7G	10	10	1.5	1.5	1
VF5000-C4T1P5G	10	10	1.5	1.5	1
VF5000-C4T2P2G	16	10	2.5	2.5	1
VF5000-C4T4P0G	20	16	2.5	2.5	1
VF5000-C4T5P5G	32	20	4	4	1
VF5000-C4T7P5G/P	40	32	6	6	1
VF5000-C4T11PG/P	63	35	6	6	1
VF5000-C4T15PG/P	63	50	6	6	1
VF5000-C4T18P5G/P	100	63	10	10	1
VF5000-C4T22PG/P	100	80	16	16	1
VF5000-C4T30PG/P	125	100	25	25	1
VF5000-C4T37PG/P	160	125	25	25	1
VF5000-C4T45PG/P	200	160	35	35	1

VF5000-C4T55PG/P	200	160	35	35	1
VF5000-C4T75PG/P	250	200	70	70	1
VF5000-C4T90PG/P	315	250	70	70	1
VF5000-C4T110PG/P	400	315	95	95	1
VF5000-C4T132PG/P	400	400	150	150	1
VF5000-C4T160PG/P	630	450	185	185	1
VF5000-C4T200PG/P	630	560	240	240	1
VF5000-C4T220PG/P	800	630	270	270	1
VF5000-C4T245PG/P	800	630	270	270	1
VF5000-C4T280PG/P	1000	800	150×2	150×2	1

3.5 Diagram of wiring for basic running

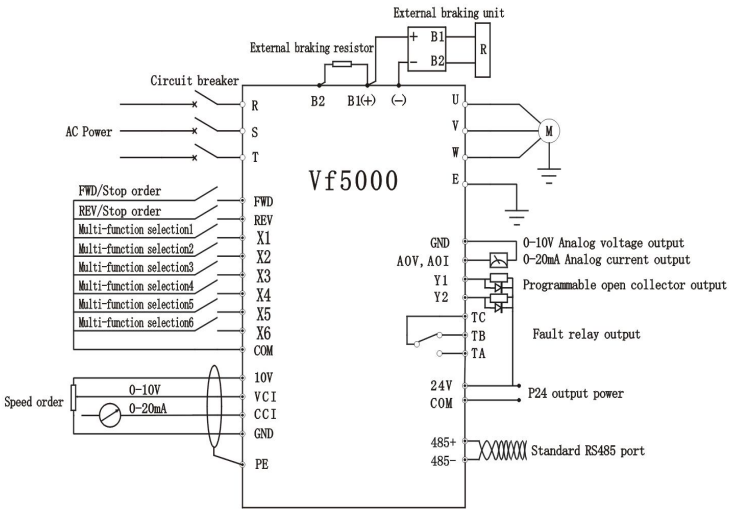


Diagram 3-5 diagram of wiring for basic running. Applicable inverter :VF5000-C4T0P7G～VF5000-C4T15PG/P

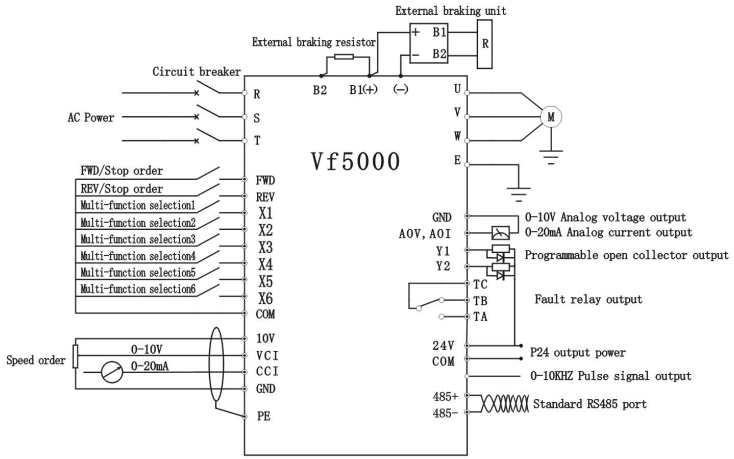


Diagram 3-6 diagram of wiring for basic running. Applicable inverter :VF5000-C4T18P5G/P～VF5000-C4T315PG/P

3.6 Control circuit configuration and wiring

3.6.1 Layout of control circuit terminal as follows:

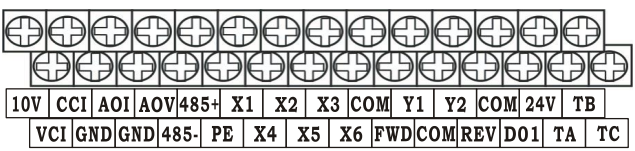


Diagram 3－7 Diagram of control panel terminals arrangement

3.6.2 Description of control circuit terminal function shown as table3-4

Type	Terminal no.	Name	Terminal function	Spec.
Communication	485+	RS485 communication interface	RS485 differential signal positive terminal	Standard RS485 communication interfaces and twisted pair line or shielded line
	485-		RS485 differential signal negative terminal	

Multi-function output terminal	Y1.Y2	Open collector output terminal 1	Programmable multi-function digital output terminal is referred to the introduction about output terminal function of terminal function parameter. F4.07-F4.08 in chapter 5 (Common terminal: COM)	Optic-coupling isolation output. Working voltage: 9~30V. Max output current: 50mA. Refer to F4.07-F4.08 parameter description for using methods.
Relay output terminal	TA.TB.TC	Fault relay terminal	Normal: TB-TC NC; TA-TC NO Fault: TB-TC NO；TA-TC NC	Rating of contact NO：5A 250VAC NC：3A 250VAC
Analog input	VCI	Analog input VCI	Accept input of analog voltage. (Reference ground：GND)	Input voltage range：0~10V (input impendence：47KΩ) Resolution：1/1000
	CCI	Analog input CCI	Accept input of analog current and voltage (Reference ground: GND), diagram 3-9 is referred, select by dip switch on the left side of control terminal.	Input current range： 0~20mA (input impendence：500Ω) Resolution：1/1000
Analog output	AOI, AOV DO1	Analog output AOV, AOI	Provide analog voltage or current output, can express 7 analog quantity, indicate the default of motor rotation speed.	Voltage output range:： 0~10V Current output range： 0~20mA
Running control terminal	FWD	Forward running order	Forward /reverse digital command, is referred to introduction of function parameter two-wire and three-wire control function	Optic-coupling isolation input Input impendence: R=2KΩ Max input Freq.: 200Hz Input voltage:9～30V Closing avaiable X1~X6 FWD、REV COM
	REV	Reverse running order		
Multi-function input terminal	X1	Multi-function input terminal1	Programmable multi-function digital output terminal is referred to introduction about output terminal function of terminal function parameter (Digital input/output). (Common terminal: COM)	
	X2	Multi-function input terminal 2		
	X3	Multi-function input terminal 3		
	X4	Multi-function input terminal 4		
	X5	Multi-function input terminal 5		
	X6	Multi-function input terminal 6		Max input Freq.: 20KHz
Power	10V	+10V power	Provide +10v power supply	Max output current: 50mA

			for external.(Negative end：GND)	
	GND	+10Vpower common terminal	Analog signal and reference group of +10V power supply	Mutual inner isolation shall be produced between COM and GND
	COM	+24V power common terminal	Input/output common terminal of digital signal	

Table 3-4 control plate CN3 terminal function

3.6.3 Wiring of analog input/output terminal

(1) VCI terminal accepting input of analog voltage signal, its wiring as follows:

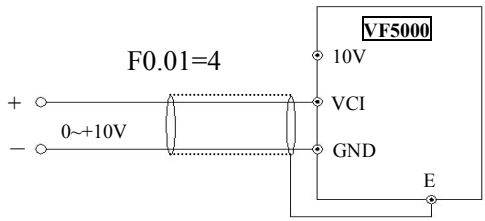


Diagram 3-8 VCI terminal wiring

(2) CCI terminal accepting input of analog current and voltage signal, its wiring as follows:

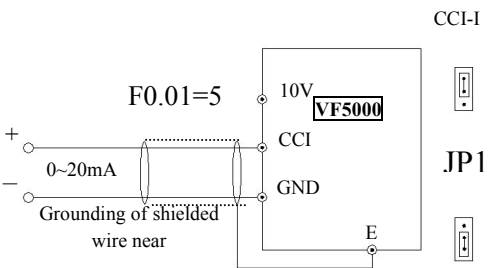


Diagram 3-9 CCI terminal wiring

(3) Wiring of analog output terminal AOV、AOI

Analog output terminal AOV 、 AOI with peripheric analog meter can indicate different physical quantities（F5.09）,its wiring is shown as diagram 3-10.

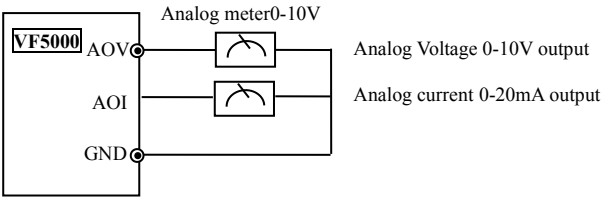


Diagram 3-10 Analog output terminal wiring

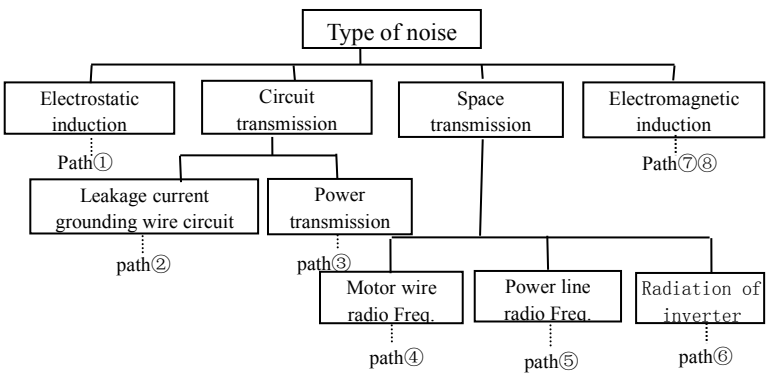
Note: Because analog input/output signal is apt to suffer from external interference, the wiring must be provided with the shielded cable; in addition, the cable shall be earthed reliably and as short as possible.

3.7 Installation guide in lien with EMC requirement

Because the inverter outputs PWM wave, some electromagnetic noise will be made when it operates, in order to prevent inverter interfering outside, this section mainly introduces the methods of installing inverter EMC on the aspect if noise suppression, field wiring, grounding, leakage current, power filter and so on.

3.7.1 Noise suppression

1. Type of noise



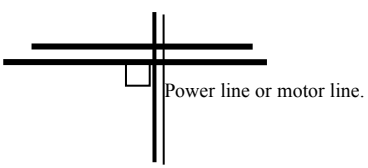
2. Basic solution against suppressing noise

Table 2-5 Solution against suppressing the interference

Noise transmission path	Solution
②	When the grounding wire of peripheral equipment with laying wire of inverter forms the closed loop circuit, the leakage current of grounding wire will enable the equipment to produce false operation. At this time, if the equipment isn't earthed the false operation can be avoided.
③	When the power supply of peripheral equipment and power supply of inverter are provided with the same system, the noise from inverter will transmit with inverting the power line, thus, other equipment in the same system will be affected. The following measures can be used to suppress the noise: Mount an electromagnetic noise filter at input terminal of inverter; other equipment is isolated with isolating transformer or power filter.
④⑤⑥	（1）The equipment and signal wire that is apt to be interfered shall be kept far from the inverter. The signal wire shall be shielded wire. The single end of shielded layer shall be earthed, and kept away the inverter and its input\output wire as far as possible. If the signal wire must be crossed with heavy-current cable, they are must be kept in quadrature. （2）The roots of input/output side of inverter are installed with high-frequency noise filter (common mode chock of ferrite), to suppress the radio frequency interference of power line effectively. （3）The cable of motor shall be put in the shield if large thickness, if installed in the pipe of over 2mm or embedded into cement slot, the power line shall be covered in the metallic pipe, and the shielded wire is used to earth.
①⑦⑧	Avoid heavy and light current conductors being laid in parallel or tied together, the wiring shall be kept away from the installation equipment of inverter and input/output wire as far as possible. The signal wire and power wire shall be the shielded wire. The equipment with strong electric field or magnetic field shall be kept a certain distance from the installation place of inverter or be kept in quadrature.

3.7.2 Field wiring and grounding

1. The line connecting the inverter to motor(U、V、W terminal outgoing wire) shall be avoided laying with the power line in parallel(R、S、T or L、N terminal input wire).And they shall be kept over 30cm gap.



Diagam3-12 System wiring

2. There motor lines of inverter U、V、W Terminals shall be put in the metallic pipe or metallic wiring groove.

3. Control signal line shall be shielded cable; the shielded layer is connected to PE Terminal of inverter, and earthed near the single end of inverter side.
4. The PE terminal grounding cable can't be provided with other equipment earth wire, it must be connected to grounding plate directly.
5. Control signal wire can't be laid with cable of heavy current in parallel or in a near distance (R、S、T or L、N and U、V、W), and they can't be tied together either, shall be kept over 20-60cm, distance (relevant to strong current size). As is shown in diagram 3-12, they shall be laid in vertical if need cross. As diagram 3-12.
6. Light-current grounding wires like signal control line, sensor line and strong-current grounding wire must be earthed independently.
7. Never connect other equipment to power supply input terminal (R、S、T or L、N) of inverter.

4 Running and operating of inverter

4.1 Running of inverter

4.1.1 Running order channels F0.04

VF5000 inverter has 3 kinds of order channels for controlling running operation such as start, stop, jog, etc.

0. Operation keypad

Control by keys RUN STOP RESET JOG on keypad to start or stop the motor.

1. Control terminal

Use control terminal FWD、REV、COM to make double-line control, or use one of the terminals ofX1~X6 and two terminals FWD and REV to make 3-line control.

2. Serial port

Control start or stop of the inverter through upper machine or other devices which can communicate with the inverter.

Choose order channel by setting function code F0.04.

4.1.2 Frequency-provision channelsF0.01

Under common running mode, VF5000 series inverter has 9 kinds of provision channels:

0: Keypad analogy POT provision
1: Digital setting 1 keypad ▲ 、▼ provision
2: Digital setting 2 terminal UP/DOWN provision
3: Digital setting 3 terminal communication provision
4: VCI analogy provision (0-10V)
5: CCI analogy provision (0-20mA)
6: Terminal pulse (0-10KHZ) provision
7: Value combination provision
8: Outer terminal provision

4.1.3 Work State

Work states of VF5000 are classified as Stop State, Run State, Programming State and Failure Alarm State:

Stop State: If there is no running command after the inverter electrified or after stop command during running state, the inverter enters into waiting state

Running State: Received run command, the inverter enters into running state

Programming State: By operating keypad, modify and set the function parameters of the inverter

Failure Alarm State: Malfunctions caused in external devices or the inverter or operation errors; the inverter shows relevant malfunctions codes and block outputs

4.1.4 Run mode

VF5000 inverter has five run modes, following is in turn according to their priorities, they are: jog run→closed-loop run→PLC run→multi-speed run→ common run. Shown as diagram 4-1.

0: Jog run

Upon receiving jog run command (for instance, press the JOG key on keypad) during stopping state, the inverter runs at jog frequency (see function code F2.19~ F2.21).

1: Closed-loop run

The inverter will come into closed-loop

2: PLC run

The inverter enters into PLC run mode and runs according to preset through setting PLC dffective parameter (F7.00=1). PLC run mode can be paused by multi-function terminal.

3: Mult-speed run

By nonzero combination of multi-function terminal (function 1、2、3), choose multi-frequency 1~7 (F2.28～F2.34) to run at multi-speed speed.

4: Common run

Simple open-loop run mode if vector inverter.

Above five kinds of run modes can run according to different frequency setting except “jop run”. Additionally, “PLC run”, “multi-speed run”, “common run” can be adjusted as wobbing adjustment.

4.2 Operating and using of keypad

4.2.1 Keypad layout

Operating keypad and control terminals can control the motor to run, change speed, stop, brake, set the run parameters and external decices. Operating keypad is shown as diagram 4-2 and remote-control keypad is shown as diagram 4-1.

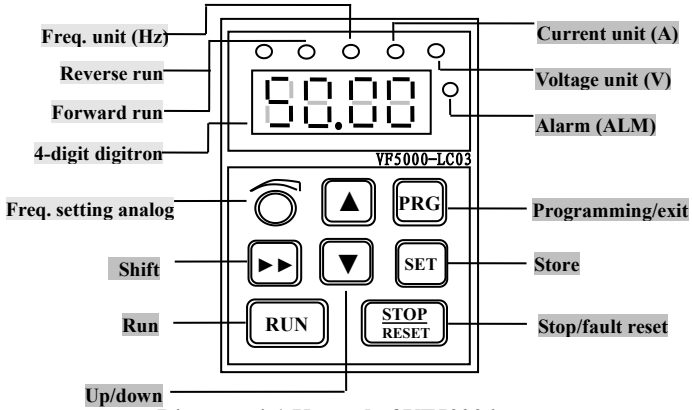


Diagram 4-1 Keypad of VF5000 inverter

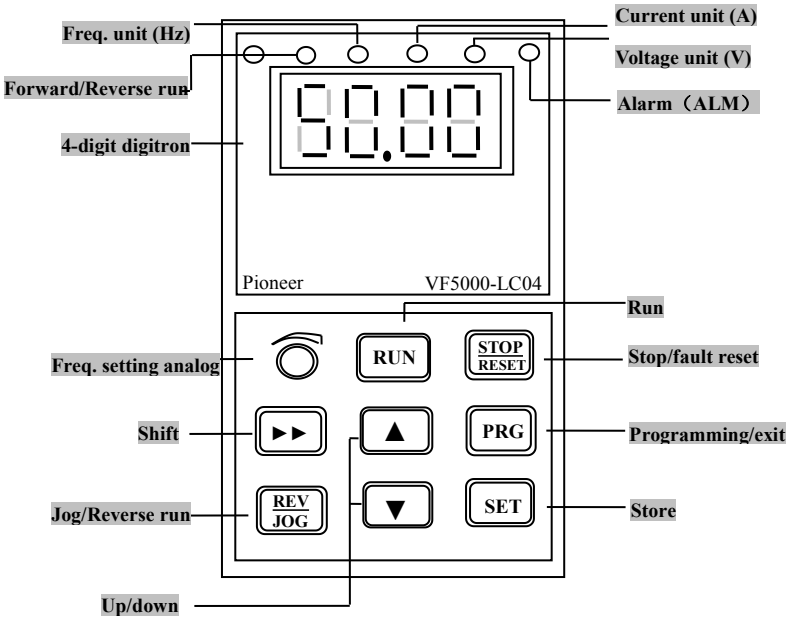


Diagram 4-2 Remote-control keypad

4.2.2 Keypad function description

There are eight (seven) buttons and one keypad analog POT on the inverter keypad, they function are defined as follows:

Key	Name	Function definition
RUN	Run key	Enter into run mode under keyboard mode
STOP RESET	Stop/Reset key	In common run status the inverter will stop according to set mode after this key is pressed if run command channel is set as panel effective mode. The inverter will reset and resume normal stop status after this key is pressed when the inverter is in malfunction status.
PRG	Program key	Enter into or exit Program/Monitor status
REV JOG	Jog/Reverse key	Jog or Reverse run is available when pressing this key under keyboard mode
▲	Up key	Data or function codes increase
▼	Down key	Data or function codes decrease
►►	Shift/Monitor key	Choose the digit of the data which is to be set and modified when the inverter is in edition status; switch monitor parameter to be shown when the inverter is in other statuses.
SET	Date/Store key	Enter into next level menu or store function code when the inerter is in programming status.
	Analog potentiometer	Choosing and adjusting analog POT provision (F0.01=0), is able to control the inverter output frequency.

4.2.3 LED and indicator light description

There is 4-bit 8-section LED, 3 unit lights, 3 status indicator lights on the local operation keypad of the inverter, shown as diagram4-3:

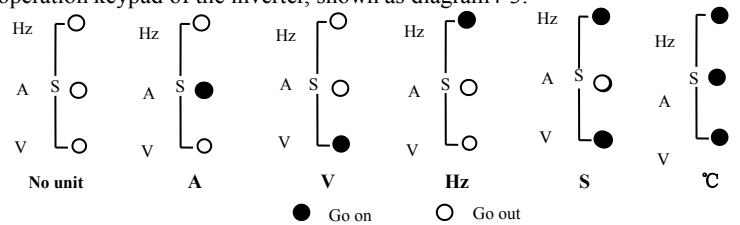


Diagram 4-3 Relation between unit indicator light and unit

Three status indicator lights: FWD (forward run), REW (reverse run), ALM (alarm) from left to right on the upper part of LED, their respective indicating meaning is shown in table 4-1

Table 4-1 Status indicator light description

<table>
<tr><th colspan="3">Item</th><th colspan="2">Function description</th></tr>
<tr><td rowspan="4">Display function</td><td colspan="2">LED display</td><td colspan="2">Display current run status parameter and set parameter</td></tr>
<tr><td rowspan="3">Status indicator light</td><td>FWD</td><td>Forward run indicator light, indicates that the inverter output forward phase order and the connected motor rotates in forward direction</td><td rowspan="2">The inverter works in DC brake status if FWD 、 REV indicator lights go on at the same time.</td></tr>
<tr><td>REV</td><td>Reverse run indicator light, indicates that the inverter output reverse phase order and the connected motor rotates in reverse direction</td></tr>
<tr><td>ALM</td><td colspan="2">When inverter occurs fault alarming, this light will go on.</td></tr>
</table>

4.2.4 Keypad display state

VF5000 keypad display status is classified as stop parameter display status, function code parameter editing status display, malfunction alarm status display, and run status parameter display in total 4 kinds of status.

1. Stop parameter display status

The inverter is in stop status and the status supervision parameter, usually the setting frequency (D-00) is displayed on keyboard. Unit is displayed by rightward unit indicator light.

To press [►►] key，it can display different stop status supervision parameters circularly (default d group of supervision parameter, for detail please see d group status supervision parameter in function parameter schedule graph of chapter 5). Pressing [PRG] , [▲] , [▼] to switch and display status will be switched to constant supervision parameter F3.04 (namely set frequency), which is set by D-00, displays automatically if there is no key pressed within 1 minute.

2. Run parameter display status

The inverter enters into run status when receiving effective run command and run status supervision parameter normally output frequency (D-00) is displayed on the keyboard. Unit is displayed by rightward unit indicator light.

To press [►►] key, it can display different run status supervision parameter circularly. Pressing [PRG] and [▲] , [▼] to switch and display status will be switched to constant supervision parameter F3.04 (namely set frequecncy), which is

set by D-00, display automatically if there is no key pressed within 1 minute.

3. Failure alarm display status

The inverter enters into failure alarm display status upon detecting failure signal and displays failure code sparklingly (as shown in Fig. 4-4). To press PRG enters into program mode to check d group parameter. It can be carried on failure restoration by pressing key STOP RESET on the keypad, control terminal or ommunication command after troubleshooting. Keep displaying failure code if failure exists continuously.

Diagram 4-4 Failure alarm display status

Warning:

4. Function code editing status

Under waiting, run or failure alarm status, press PRG key, can enter into editing ststus and editing status is displayed according to two chasses' menu mode, as shown in diagram 4-5. The sequence is function code→function code parameter; pressing SET key can enter into one class by one class. Under function parameter display status, to press SET key to carry on parameter storage operation, to press PRG key can only come back to upper class menu without storing modified parameter.

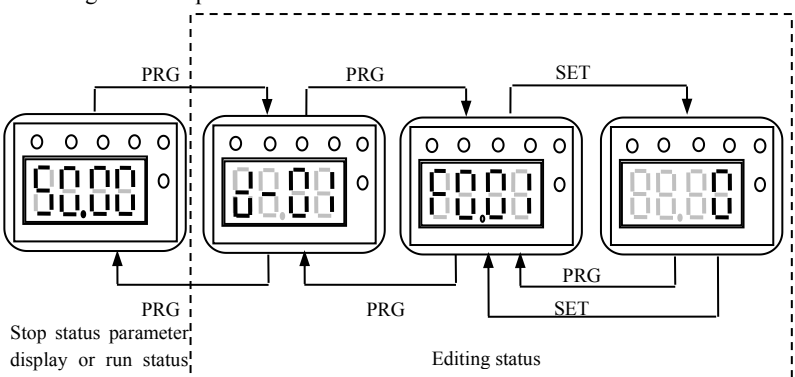


Diagram 4－5 Programming display status of operating panel

4.2.5 Method for using keypad

Can carry on various operations to the inverter through operating keypad, for example：

1. Ststus parameter display switching:

Pressing key ▶▶ display D group status supervision parameter. Method for switching is shown as diagram 4－6:

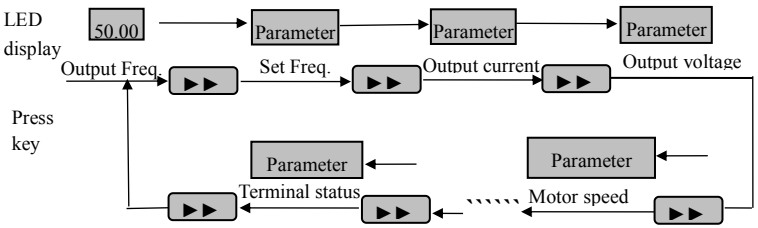


Diagram 4-6 Example of Run status parameter display operating

(1) Only D-00～D-28 status parameters can be displayed when shipping out the inverter.

(2) Pressing SET key to switch into defaulting supervision display status directly when the user see about status supervision parameter. Defaulting supercision parameter in stop ststus is set frequency and in status, it is output frequency.

2. Setting of function code parameter

Take function code F2.19 modified from 10.00Hz to 18.50Hz as example.

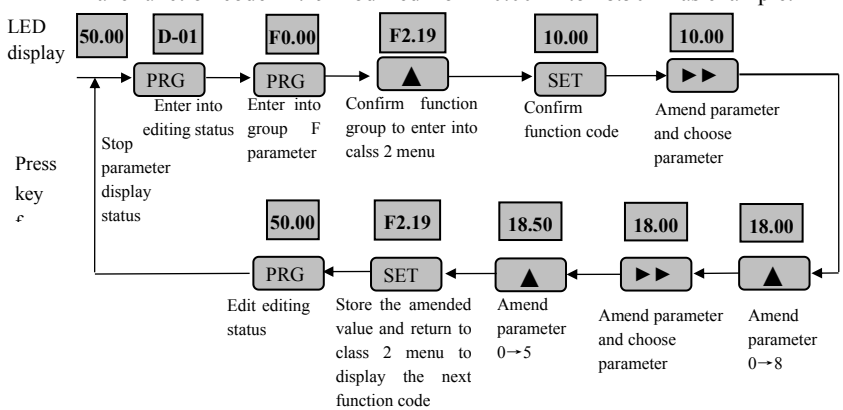


Diagram 4-7 Example of editing parameter operation

Description: under menu status, if the parameter has no flashing digit, this function code can not be modified, possible reasons are as follows:

(1) This function code is the parameter that is not amendable, for example, actual detected status parameter, run record parameter etc;

(2) This function code can not be modified under run status and can be changed after stopping running.

(3) When parameter is protected, all the function codes can not be modified.

3. Jog run operation

Assumed keypad as current run command channel, jog run frequency 10Hz, in stop status, the example as follows:

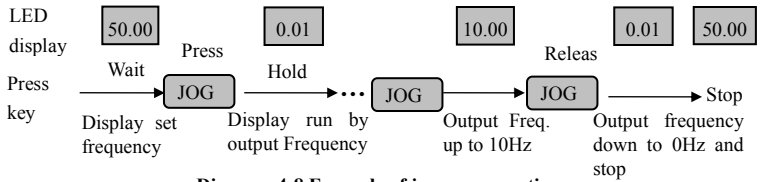


Diagram 4-8 Example of jog run operation

4. Run, stop and forward/reverse switching

Assumed keypad as current run command channel, specified frequency 20.00HZ, forward run, in waiting status, the example as follows:

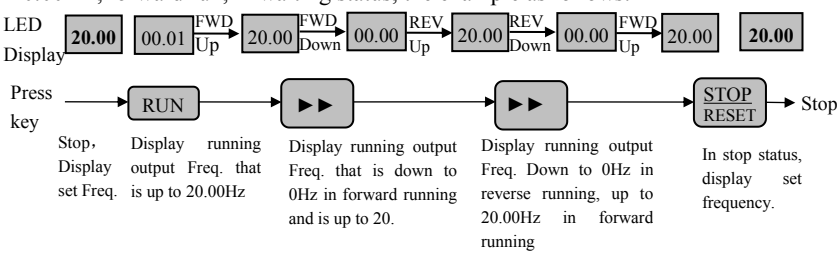


Diagram 4-9 Example of jog run operation

5. Specified frequency keypad▲、▼key providing operation

Assumed current status is stop parameter stop ststusF0.01=1, the operation as follow:

(1) Frequency adjustment is provided with integral way;

(2) Pressing ▲ key not release, the lowest digit increase at first; if the tens digit carries on, tens digit increase; if the hundreds digit carries on, hundreds digit increase… Pressing ▲ the ▲ key again after the key is released, value increases from lowest digit again.

(3) Pressing [▼] key not release, the lowest digit decrease at first; if the tens digit carries on, tens digit decrease; if the hundreds digit carries on, hundreds digit decrease… Pressing the [▼] key again after the key is released, value deceases from lowest digit again.

4.3 Inverter electrification

4.3.1 Check before electrification

Please carry on wiring based on operation requirement provided in "Inverter wiring" of this manual.

4.3.2 Initial electrification

Close input side AC power supply switch after correct wiring and power supply confirmed, electrify the inverter and keypad LED display starting status, contactor closes normally, and LED displaying set frequency shows that electrification is finished.

5 Specification of function parameter table

5.1 Basic parameter

F0.00	Control mode			Factory default	1
	Set range	0	Sensorless vector control		
		1	V/F control		

0: Sensorless vector control: It is widely used for the application which requires high torque at low speed, higher speed accuracy, and quicker dynamic response, such as machine tool, injection molding machine, centrifugal machine and wire-drawing machine,etc.

1: V/F control: It is suitable for general purpose application such as pumps, fans etc.

F0.01	Frequency input channel selection			Factory default	0
	Set range	0	Keypad otentiometer setting		
		1	Digital setting 1, keypad		
		2	Digital setting 2 (terminal UP/DOWN adjust)		
		3	Digital setting 3 (serial port)		
		4	Terminal VCI analog setting(0～10V)		
		5	Terminal CCI analog setting(0～20mA)		
		6	Terminal pulse(0～10kHz)		
		7	Combination setting		
		8	Outer terminal		

0: Keypad otentiometer setting: Set running frequency by keypad otentiometer.

1: Digital setting 1, keyboard: Initial set frequency value is F0.03, can change set frequency by changing F0.03 parameter through keypad, and you can also modify F0.03 by ▲/▼ key.

2: Digital setting 2, terminal UP/DOWN adjust: Initial set frequency value is the value stored during the last power off time, and you can adjust set running frequency by terminal UP/DOWN.

3: Ditital setting 3: Change the set frequency by set frequency command of RS485 serial port.

4: VCI analog setting(0 ～ 10V): External analog voltage setting is used as set frequency. Please refer to parameter F5.00-F5.01。

5: CCI analog setting(0～20mA): External analog current setting is used as set frequency. Please refer to parameter F5.02-F5.03。
6: Terminal pulse (0～10kHz): Pulse frequency input from terminal X6 is used as the set frequency, the corresponding relation between input frequency and set frequency is determined byF5.04-F5.05
7: Combination setting: Each channel combination setting is used as set frequency. Please refer to parameter F2.09.
8: Outer terminal

F0.02	Digital frequency control		Factory default	00
	Set range	00-11		

LED first bit:
0: When the drive is powered off or at undervoltage state, update F0.03 by the actual frequency at that time.
1: when the drive is powered off or at undervoltage state, F0.02 remains unchanged.
LED second bit:
0: the reference frequency when the drive stops will be saved.
1: The reference frequency will restore to F0.02 when the drive stops.

F0.03	Frequency digital seeting		Factory default	0
	Set range	0.00-upper limit frequency		

When the setting way of running frequency is 1, namely, when the operatingpanel sets (F0.01=1), this function parameter is the initial set frequency of inverter.

F0.04	Run command channel selection			Factory default	0
	Set range	0	Keypad run control		
		1	Terminal run command control		
		2	Serial port run command control		

This parameter is used to choose the running command; there are total three running commands for selection
0: Keypad run control: Press RUN、STOP/RESET、REV/JOG on the operating panel to control the start and stop
1: Terminal run command control: Use external control terminal FWD and REV to

control the start and stop.
2: Control the start and stop by the serian port.

F0.05	Run direction setting			Factory default	0
	Set range	0	Forward run		
		1	Reverse run		
		2	Prevent reversing		

0: Forward run: The actual running direction is indentical with the set direction.
1: Reverse run: When this way is chosen, the actual output phase sequency of inverter is opposite to the set direction, if terminal control, FWD-COM will close, the motor will rotate reversely. The function of RUN key on the keypad turns to reverse running.

F0.06	Upper limit frequency		Factory default	50.00Hz
	Set range	[F0.07]—400.0Hz		
F0.07	Lower limit frequency		Factory default	0.00Hz
	Set range	0.00Hz—[F0.00]		

Upper limit frequency is set to the upper limit of output frequency, set range is [F0.07]—400.0Hz；
Lower limit frequency is set to the lower limit of output frequency, set range is 0.00Hz—[F0.06]；

F0.08	Basic run frequency		Factory default	50.00Hz
	Set range	1.00-upper limit frequency		

Basic frequency normally corresponds with the rated frequency of the motor. It is the Min frequency when the drive outputs the highest voltage.

F0.09	Max output voltage		Factory default	380V/220V
	Set range	200V—500V/100V—250V		

Max output voltage is the drive's output voltage when the drive outputs base frequency. This corresponds to the rated voltage of the motor.

F0.10	G/P option		Factory default	0
	Set range	0	G model	
		1	P model	

0: Applicable to constant torque load
1: Applicable to variable torque load such as pumps and fans.
VF5000 series inverters provide the G/P integration function. The adaptive motor powerused for constant torque load (G model) should be one grade less than that used forvariable torque load (P model).

F0.11	Torque boost mode		Factory default	0
	Set range	0	Manual boost	
		1	Automatic boost	
F0.12	Torque boost		Factory default	Depend on model
	Set range	0—30%		

Manual boost: Torque boost voltage is determined completely by parameter F0.12, its characteristic is boost voltage fixed, but the motor is prone to magnetic saturation when lightly loaded.
Automatic boost: Torque boost voltage varies as stator current of the motor changes, bigger stator current corresponds to bigger boost voltage.
In order to compensate the low frequency torque, boost the output voltage in the low frequency zone as Vb shown in Fig. 5-1.

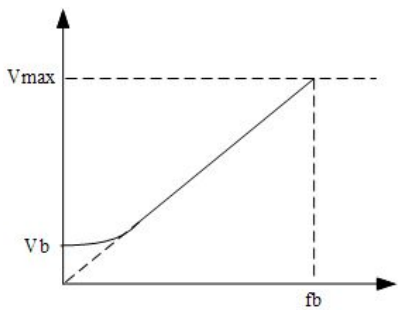


Fig 5-1 Torque boost

F0.13	Slip frequency compensation		Factory default	0.0%
	Set range	0.0—150.0%		

The change in motor torque will affect motor slip and result in speed change. Through slip compensation, the output frequency can be adjusted according to motor load torque, so as to reduce speed change caused by load change.

F0.14	Acc time 1		Factory default	Depend on model
F0.15	Dec time 1		Factory default	Depend on model
	Set range	0.1—3600s		

Acceleration time denotes the time from 0 Hz acceleration to upper-limit frequency. Deceleration time denotes the time from upper-limit frequency deceleration to 0 Hz.

F0.16	V/F curve setting		Factory default	0
	Set range	0-3		

0: Constant torque curve: Applicable for most loads, is shown as the straight line.
1: Degressive torque curve 1: A 1.7-order curve is selected.
2: Degressive torque curve 2: A 2-order curve is selected.
The above V/F curves except the constant torque curve are suitable for the variable-torque loads such as fan & pumps. The user can select the curves according to the actual load so as to achieve the best energy-saving effects.
3: End-user sets V/F curve himself: You can define a curve byF0.17～F0.22

F0.17	V/F frequency value F1		Factory default	12.50Hz
	Set range	0.00—Frequency value F2		
F0.18	V/F voltage value V1		Factory default	25.0%
	Set range	0.0—Voltage value V2		
F0.19	V/F frequency value F2		Factory default	25.00Hz
	Set range	Frequency value F1—Frequency value F3		
F0.20	V/F voltage value V2		Factory default	50.0%
	Set range	Voltage value V1—Voltage value V3		

F0.21	V/F frequency value F3		Factory default	37.50Hz
	Set range	Frequency value F2—Basic run frequency		
F0.22	V/F voltage value V2		Factory default	75.0%
	Set range	Voltage value V2—100.0%		
F0.23	REV/JOG		Factory default	1
	Set range	0	REV	
		1	JOG	

5. 2 Motor and vector control parameters

F1.00	Motor rated voltage		Factory default	380V/220V
	Set range	200V—500V/100V—250V		
F1.01	Motor rated current		Factory default	Depend on model
	Set range	0.1—500.0A		
F1.02	Motor rated speed		Factory default	Depend on model
	Set range	300—6000RPM		
F1.03	Motor rated Frequency		Factory default	50.00Hz
	Set range	1.00—400.00Hz		
F1.04	Current without load		Factory default	0.1A
	Set range	0.1—500.0A		

In order to achieve superior performance, please set these parameters according to motor nameplate, then perform autotuning. The power rating of inverter should match the motor. If the bias is too big, the control performances of inverter will be deteriorated distinctly.

F1.05	Motor stator resistance	Factory default	Depend on model
	Set range	0.001—10.000Ω	
F1.06	Motor rotor resistance	Factory default	Depend on model
	Set range	0.001—10.000Ω	

F1.07	Motor leakage inductance		Factory default	Depend on model
	Set range	0.01—600.00mH		
F1.08	Motor mutual inductance		Factory default	Depend on model
	Set range	0.01—600.00mH		
F1.09	Reserved			

After autotuning, the value of P1.05~P1.08 will be automatically updated.

Notice: Do not change these parameters, otherwise it may deteriorate the control performance of inverter.

F1.10	Slip compensation rate	Factory default	1.00
	Set range	0.50—2.00	

The parameter is used to adjust the slip frequency of vector control and improve the precision of speed control. Properly adjusting this parameter can effectively restrain the static speed bias.

F1.11	Pre-excitation selection		Factory default	0
	Set range	0	Valid under certain condition	
		1	Permanently invalid	
F1.12	Pre-excitation time		Factory default	0.2S
	Set range	0.1～10.0S		
F1.13	Motor parameters autotuning		Factory default	0
	Set range	0	No action	
		1	Static autotuning	

0: No action

1: Static autotuning

If it is difficult to disconnect the load, static autotuning is recommended. The operation process is the same as rotation autotuning except step c.

The Mutual inductance and current without load will not be detected by static autotuning, if needed user should input suitable value according to experience.

F1.14	ASR proportional gain Kp		Factory default	1.00
	Set range	0.01～5.00		
F1.15	ASR integral time Ki		Factory default	2.00S
	Set range	0.01～10.00S		

F1.14, F1.15 are only valid for vector control and invalid for V/F control.
Through F1.14, F1.15, you can set the proportional gain P and integration time I of speed regulator, so as to change the speed response characteristic. The system's dynamic response can be faster if the proportion gain P is increased; However, if P is too large, the system tends to oscillate. The system dynamic response can be faster if the integration time I is decreased; However, if I is too small, the system becomes over adjusted and tends to oscillate. Proportion gain P is usually adjusted first. Under the condition that the system is immune from oscillation, P can be increased as big as possible. Then adjust integration time I so that the system responds fast and will not be over adjusted.

5.3 Auxiliary parameter

F2.00	Starting way		Factory default	0
	Set range	0	Start from start frequency	
		1	Speed tracking start	
F2.01	Starting frequency		Factory default	0.00Hz
	Set range	0.00—10.00Hz		
F2.02	Starting Frequency duration		Factory default	0.0s
	Set range	0.0～10.0s		

0: Start from start frequency
When inverter begins running, it starts from start frequency (F2.01) and runs for the preset time at this frequency (F2.02) according to the setting values of F2.01 and F2.02; then it enters normal Acc mode according to preset Acc time and Acc/Dec mode parameters, at last it acelerates to preset frequency.
1: Speed tracking start
When the inverter begins running, first it detects the motor 's speed and direction, then it starts smoothly at the detected speed and direction. Smooth start without impaction should be performed on spinning motor.

When this start mode is selected, the system's inertia should be considered, and the setting value of Acc/Dec time should be increased properly.
Start frequency: It is the initial frequency when the inverter starts from 0 Hz.
In the Acc and Start process, if the preset frequency is lower than the start frequency, inverter's output frequency becomes zero.
Start frequency is effective in each Acc process in FWD and REV running process.
Start frequency holding time: the running time at start frequency in Acc/Start process.
Start frequency holding time is effective in each Start process and FWD/REV running switching process.

F2.03	DC brake current at starting		Factory default	0.0%
	Set range	0—100.0%		
F2.04	DC brake time at starting		Factory default	0.0s
	Set range	0.0—30.0s		

DC braking current at start: percentage of braking current when the inverter starts in DC injection braking process.
DC braking time at start: holding time for output DC injection braking current when the inverter is in start process.
If DC injection braking time at start is set to 0.0 second, DC injection braking function is disabled.

F2.05	Acc./Dec. mode selection		Factory default	0
	Set range	0	Linear Acc./Dcc. Mode	
		1	S curve Acc./Dec. mode	

Acc/Dec modes 0 and 1 are valid in Start, Stop, FWD/REV, Acc and Dec process.
0: Linear Acc./Dcc. Mode: In Acc/Dec process, the relationship between output frequency and Acc/Dec time is linear. The output frequency increases or decreases at the constant slope.
1: S curve Acc./Dec. mode: In Acc/Dec process, the relationship between output frequency and Acc/Dec time is nonlinear. The output frequency increases or decreases according to the S curve.

F2.06	Time of S curve's start part		Factory default	20.0%
	Set range	10.0—40.0%		
F2.07	Time of S curve's up/down part		Factory default	60.0%
	Set range	10.0—40.0%		

The function codes of F2.06 and F2.07 define the Acc/Dec parameters of S curve.
S curve start time is the stage when the slope of output frequency rises gradually.
S curve rise time is the stage when the slope of output frequency maintains Phase.
S curve end time is the stage when the slope of output frequency decreases to zero.
The combination using of function codes F2.05~F2.07 is specially suitable for the start and stop process of conveying load.

F2.08	AVR function			Factory default	1
	Set range	0	No action		
		1	Action		

0: No action
1: Action: AVR: auto voltage adjustment. This function can keep constant output voltage when the input voltage deviates from rated value. Therefore, the function should be enabled all the time especially when the input voltage is higher than the rated value. If AVR is disabled during deceleration, the Dec time is shorter but the current is higher, otherwise, the motor decelerates smoothly with lower current, but the Dec time is longer.

F2.09	Automatic energy-saving run			Factory default	0
	Set range	0	No action		
		1	Action		

0: No action
1: Action
The drive can detect load current and adjust voltage accordingly to save energy.

F2.10	FWD/REV dead time		Factory default	0.0s
	Set range	0.1—10.0s		

It refers to the time period when the drive's rotation changes from FWD to REV or REV to FWD.

F2.11	Stop mode			Factory default	0
	Set range	0	Decelerating and stopping		
		1	Coast to stop		

0: Decelerating and stopping: When the inverter reveives the command of stop, it will reduce the output frequency gradually according to the deceleration time, when the frequency falls down to zero, the inverter will stop.

1: Coast to stop: After the inverter receives the stop command, it stops its output immediately; the motor will stop according to its inertia. When selecting this mode, fast stopping can be realized through external mechanical braking.

F2.12	Initial frequency of DC injection braking		Factory default	0.00Hz
	Set range	0.0—20.00Hz		
F2.13	DC injection braking current		Factory default	0.0%
	Set range	0.0—100.0%		
F2.14	DC injection braking time		Factory default	0.0s
	Set range	0.0—30.0s		

Initial frequency of DC injection braking: It is the frequency when the inverter's output frequency is decreased to zero along the Dec curve in Dec-to-stop process. When the inverter is in Dec-to-stop process, if the preset frequency is lower than the initial frequency of DC injection braking, then the output frequency become zero. Initial frequency of DC injection braking is valid in the Dec process when the inverter is switching between FWD and REV states.

If the user selects DC injection braking function, this frequency is also the initial frequency of DC injection braking in stopping process.

If the running condition has no strict requirements for braking, the initial frequency of DC injection braking should be set as low as possible.

DC injection braking current: Percentage of braking current when the inverter stops in DC injection braking mode.

DC injection braking time: the time for maintaining output DC injection braking

current in inverter's stopping process.

F2.15	Restart after power failure			Factory default	0
	Set range	0	No action		
		1	Action		
		2	Speed tracking start		
F2.16	Delay time for restarting after power failure			Factory default	0.5s
	Set range	0.0—20.0s			

When the power recovers from failures, the time before the inverter restarts is the delay time.

This time is set according to the time needed by other equipment to recover when the utility power recovers.

F2.17	Failure self-reset times		Factory default	0
	Set range	0-10		
F2.18	Failure self-reset interval		Factory default	3.0s
	Set range	0.5-25.0s		

The fault self-reset function is used to make the inverter that can't run for load fluctuation or other reasons resume to run with the set times (F2.17) and interval (F2.18). In self-resertting course, the inverter resumes to run with the speed tracking restart way. If in the range of the reset times by setting, the inverter can't come back to run normally, it will make the fault protection.

F2.19	Jog run frequency		Factory default	10.00Hz
	Set range	0.00—50.00Hz		
F2.20	Jog Acc.time		Factory default	Depend on model
F2.21	Jog Dec. time		Factory default	Depend on model
	Set range	0.1—3600s		

Jog running command can be issued through keypad, control terminal or host.

F2.22	Acc time 2	Factory default	Depend on model
F2.23	Dec time 2	Factory default	Depend on model
F2.24	Acc time 3	Factory default	Depend on model
F2.25	Dec time 3	Factory default	Depend on model
F2.26	Acc time 4	Factory default	Depend on model
F2.27	Dec time 4	Factory default	Depend on model
	Set range	0.1-3600s	

Three kinds of Acc/Dec time can be defined, and the drive's Acc/Dec time 1~4 can be selected by different combinations of control terminals, refer to F4.00~F4.05 for the definitions of terminals used to select Acc/Dec time.

F2.28	Multi-frequency 1	Factory default	5.00Hz
F2.29	Multi-frequency 2	Factory default	10.00Hz
F2.30	Multi-frequency 3	Factory default	15.00Hz
F2.31	Multi-frequency 4	Factory default	20.00Hz
F2.32	Multi-frequency 5	Factory default	25.00Hz
F2.33	Multi-frequency 6	Factory default	30.00Hz
F2.34	Multi-frequency 7	Factory default	40.00Hz
F2.35	Reserved		
	Set range	0.00-upper limit frequency	

This group of parameters defines the running frequency of section 1~7 of simple multi-speed running, these running frequencies are used in the course of multi-speed running. Please refer to parameter F7.00.

F2.36	Kick frequency 1	Factory default	0.00Hz
F2.38	Kick frequency 2	Factory default	0.00Hz
F2.40	Kick frequency 3	Factory default	0.00Hz
	Set range	0.0—upper limit frequency	

F2.37	Kick range 1	Factory default	0.00Hz
F2.39	Kick range 2	Factory default	0.00Hz
F2.41	Kick range 3	Factory default	0.00Hz
	Set range	0.0—10.0Hz	

Kick frequency is set to prevent the output frequency of inverter from meeting the mechanical resonant point of load. In kick frequency parameters, set the system's mechanical resonant centeral frequency, at most three frequency values can be setup. Among the parameters of F2.37、F2.39、F2.41, the frequency range of the widest resonant band can be set. After the jump frequency is set, even if the inverter's preset frequency is in the resonant frequency band of the drive system, the inverter's output frequency will be adjusted to be out of the resonant frequency band to avoid resonance.

F2.42	Carrier frequency regulation	Factory default	Depend on model
	Set range	1.0—12.0KHz	

Carrier frequency will affect the noise of motor and the EMI of inverter.
If the carrier frequency is increased, it will cause better current wave, less harmonic current and lower noise of motor.
The factory setting is optimal in most cases. Modification of this parameter is not recommended.
If the carrier frequency exceeds the factory setting, the inverter must be derated because the higher carrier frequency will cause more switching loss, higher temperature rise of inverter and stronger electromagnetic interference.
If the carrier frequency is lower than the factory setting, it is possible to cause less output torque of motor and more harmonic current.

F2.43	Carrier control mode		Factory default	1
	Set range	0	Settled carrier	
		1	Automatic carrier adjusting	

5.4 User's management parameter

F3.00	LCD language		Factory default	0
	Set range	0	Chinese	
		1	English	

F3.01	Parameter initialization		Factory default	0
	Set range	0	No action	
		1	Restore factory default	
		2	Clear fault records	

0: No action

1: Inverter restores all parameters to factory default except F0.00、F0.01、F0.04、F0.10

2: Inverter clear all fault records.

This function code will restore to 0 automatically when complete the function operation.

F3.02	Parameter write protection		Factory default	0
	Set range	0	All parameters are allowed to be modified	
		1	Except frequency, others are not allowed to be modified	
		2	Parameters are forbidden to overwrite expect this parameter	
F3.03	Manufacturer parameter		Factory default	0
	Set range	0—9999		
F3.04	LED 1 display (LED)		Factory default	0
	Set range	0—18		
F3.05	LED 2 display(LCD)		Factory default	1
	Set range	0—18		

0: Output frequency (Hz)

1: Setting frequency (Hz)

2: Output current (A)
3: Output voltage (V)
4: Load motor speed (RPM/min)
5: Running linear speed (m/s)
6: Set linear speed (m/s)
7: Bus voltage (V)
8: Input AC power voltage (V)
9: Set PID value
10: Feedback PID value
11: Analog input VCI (V)
12: Analog input CCI (A)
13: Pulse input frequency (KHz)
14: Input terminal state
15: Heatsink temperature (℃)
16: Module temperature (℃)
17: Current count value
18: Setting count value

F3.06	Linear speed coefficient		Factory default	1.00
	Set range	0.01—100.0		

If displayed is line speed, line speed calculation factor:
Line speed = Frequency × Line speed factor.

F3.07	Closed-loop display coefficient		Factory default	1.00
	Set range	0.01—100.0		

The display value of closed-loop specified quantity/feedback quantity= closed-loop specified quantity/feedback quantity × closed-loop parameter display factor.

F3.08	Sofeware version		Factory default	
	Set range	0—99.99		
F3.09	Unit of Acc/Dec time		Factory default	0
	Set range	0	Second	
		1	Minute	

5.5 Digital input and output parameter

F4.00	Input terminal X1	Factory default	0
F4.01	Input terminal X2	Factory default	0
F4.02	Input terminal X3	Factory default	0
F4.03	Input terminal X4	Factory default	0
F4.04	Input terminal X5	Factory default	0
F4.05	Input terminal X6	Factory default	0
	Set range	0—30	

0: Leave control terminal unused
1: Multi-speed selection 1
2: Multi-speed selection 2
3: Multi-speed selection 3
ON/OFF combination of multi-speed running selection can define 7-section speed running curve at most.
Multi-speed selection terminal are chosen by parameters F4.00~F4.05, the multi-speed control of external terminal shall run by cooperating with the running command. The section speed controlled by terminal is shown as following table.

Multi-speed terminal3	Multi-speed terminal2	Multi-speed terminal1	Multi-speed
OFF	OFF	OFF	No Multi-speed
OFF	OFF	ON	1
OFF	ON	OFF	2
OFF	ON	ON	3
ON	OFF	OFF	4
ON	OFF	ON	5
ON	ON	OFF	6
ON	ON	ON	7

4: Acc/Dec time 1
5: Acc/Dec time 2

6~8: Frequency channel selection

Through ON/OFF combination of frequency provision channel selection terminal 6、7、8, can realize frequency provision channel switch shown in Table 5-1.

9: Forward jog control

Be used for indendently forward jog control terminal which don't need the cooperation of FWD or REW terminal.

10: Reverse jog control

Be used for iindendently reverse jog control terminal which don't need the cooperation of FWD or REW terminal.

11: Free stop control

Be used for free stop control terminal in the external terminal control mode.

12: Frequency increasing command

Be used for increasing control of frequency.

13: Frequency decreasing command

Be used for decreasing control of frequency.

14: External device failure input

Can be input the external equipment fault signal to enable inverter to performa fault monitoring against the external equipment.

15: Three-line run control

Refer to parameter F4.06

16: DC brake order

Used for carrying out DC brake for motor at the time of stopping, this terminal realizes emergency stop and accurate location of motor. Please refer to the parameters F2.12~F2.14.

17: Clear counter and input

Clearing the built-in counter, it is used together with NO.18 function (counter triggering signal input)

18: Counter triggering signal input

Count pulse input port of built-in counter, and it can be used to store current count value when power of inverter fails.

19: Pulse frequency input

This function terminal receives pulse signal as the frequency setting. The relation between input signal pulse frequency and set frequency is shown as description of F5.04、F5.05.

20: External reset input (RESET)

When the inverter makes fault alarming, this terminal can perform reset against fault. Its function is identical with the STOP key on the keypad.

21: Frequency of UP/DOWN terminal clear

This terminal is used to clear the frequency set via external terminals (set the frequency by frequency increase command UP/decrease command DOWN). When the terminal is ON, frequency setting value is cleared. This function is disabled for the frequency set by other setting modes.

22: PID running jump-in

23: Programmable multi-speed running

24: Run traverse operation jump-in

When traverse operation start mode is manual jump-in, traverse operation function effective if this terminal effective.

25: Reset traverse operation

Reference frequency of inverter will be forced as center frequency of traverse operation.

26: External stop order

This command is effective to all run command channel, when this function is effective the inverter stops running in mode set by F2.11.

27: Drive operation prohibiting

If this function is enabled, the drive that is operating will coast to stop and the drive ready to run will be prohibited to start. This function is mainly used as safety protection.

28: Acc/Dec prohibit

The motor is immune to any external command except Stop command and maintain the present speed.

Note:

This function is disabled during normal decelerating to stop.

29: Terminal control mode is enabled

When this terminal function is enabled, the operating command is input through this terminal forcibly. The drive will be controlled in the previous mode if FWD/REV terminal function is disabled.

30: Frequency reference is input via terminal CCI

If the setting is 30, the frequency reference will be input via terminal CCI forcibly. The frequency input will be changed to the previous one if this terminal function is disabled.

F4.06	FWD/REV terminal control mode		Factory default	0
	Set range	0	Two-line control mode 1	
		1	Two-line control mode 2	
		2	Three-line control mode 1	
		3	Three-line control mode 2(Reserved)	

2: Three-line control mode 1

In Fig. 5-2, SB1 is a normally closed button for stopping the motor, SB2 is a normally open button for running the motor, SB3 is a normally open button for Forward running the motor

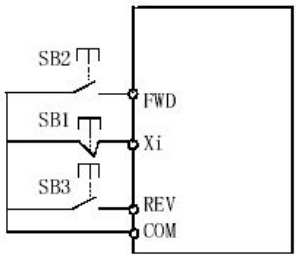


Fig. 5-2 Three-line control mode 1

F4.07	pen collector output terminal Y1 setting	Factory default	0
F4.08	Open collector output terminal Y2 setting	Factory default	1
F4.09	Programmable Relay output TA TB TC terminal	Factory default	12

0: Drive running signal

This signal will be given if the drive is running.

1: Frequency arriving signal

2: Frequency level detect signal

3: Inverter zero speed indication

4: External failure stop-running

The terminal outputs the indicating signal if the drive outputs tripping signal caused by external fault

5: Output frequency reach upper limit
The signal is given if the preset frequency is higher than upper limit of frequency and the operating frequency reaches the upper limit of frequency.
6: Output frequency reach lower limit
The signal is given if the preset frequency is higher than lower limit of frequency and the operating frequency reaches the lower limit of frequency.
7: Completion of simple PLC operation stages
The signal (pulse, 500ms) is given if one cycle of PLC operation is finished.
8: Overload alarming signal
9: Ready
10: Counter detect signal output
11: Counter reset signal output
12: Inverter failure
13: Low voltage lock-up signal
14: Upper and lower limits of traverse frequency
The signal will be given if the range of traverse frequency calculated based on central frequency is higher than upper limit of frequency or lower than the lower limit of frequency
15: PLC cycle completion indication
The signal is given (pulse, 500ms) if the present stage of PLC operation is finished.

F4.10	FDT level setting	Factory default	0.00Hz
	Set range	0.00Hz—upper limit frequency	
F4.11	FDT lag	Factory default	1.00Hz
	Set range	0.00Hz—30.00Hz	

When the drive's output frequency reaches FDT level, it outputs an indicating signal until its output frequency drops below FDT level (FDT level-FDT lag).

F4.12	Frequency checkout scope (FAR)	Factory default	0.00Hz
	Set range	0.00—15.00Hz	

If the drive's output frequency is within the detecting range of preset frequency, a pulse signal will be output.

F4.13	Overload detection threshold	Factory default	100%
	Set range	20—120%	
F4.14	Overload detection config	Factory default	1.0S
	Set range	0.0～15.0s	

F4.13 defines the threshold for overload alarm. It is a percentage of either drive's or motor's rated current.

F4.15	Preset counting value	Factory default	1
	Set range	0—9999	
F4.16	Specified counting value	Factory default	1
	Set range	0—F4.15	

When the number of pulses defined by F4.15 are input from X6, Y1 or relay will output an indicating signal.

When the number of pulses defined by F4.16 are input from X6, Y1 or relay will output an indicating signal which will last until the number of pulses defined by F4.15 are input.

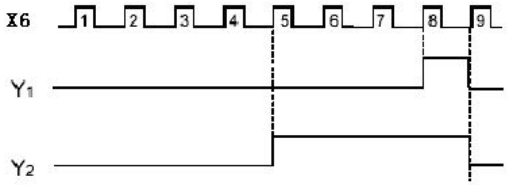


Fig. 5-3 Preset counting value and specified counting value

5.6 Analog input output parameter

F5.00	VCI input lower-limit voltage	Factory default	0.0V
	Set range	0.0—F5.01	
F5.01	VCI input upper-limit voltage	Factory default	10.0V
	Set range	F5.00—10.0V	
F5.02	CCI input lower-limit current	Factory default	0.0mA

	Set range	0.0—F5.03	
F5.03	CCI input upper-limit current	Factory default	20.0mA
	Set range	F5.02—20.0mA	
F5.04	External pulse input lower limit frequency	Factory default	0.0kHz
	Set range	0.0—F5.05	
F5.05	External pulse input upper limit frequency	Factory default	10.0kHz
	Set range	F5.04—20.0KHz	
F5.06	Set frequency corresponding to min. analog input	Factory default	0.00Hz
	Set range	0.0Hz—upper limit frequency	
F5.07	Set frequency corresponding to max analog input	Factory default	50.00Hz
	Set range	0.0Hz—upper limit frequency	

Parameters F5.06 and F5.07 are used for setting the corresponding relation between external analog input capacity and set frequency.

F5.08	Delay time of analog input signal	Factory default	0.5s
	Set range	0.1—5.0s	

The system filters analog signal input from external voltage input and external current with the setting filter time constant, to remove the influence from interference signal. The longer the time goes by, the stronger the interference resistance gets, in addition, the control is qutite stable, but the response is slower; on the contrary, the shorter the time goes by, the more fast the response gets, but interference ability is poorer, and the control may be unstable. In the practice use, if the best value can not be determined, this parameter will be adjusted properly according to control and response situation.

F5.09	AOV analog output selection	Factory default	0
F5.10	DO1 pulse output selection	Factory default	2
Set range	0	Ouput frequency	

	1	Setting frequency
	2	Output current
	3	Load motor speed
	4	Output voltage
	5	Bus-bar voltage
	6	PID provision
	7	PID feedback

F5.11	AOV gain		Factory default	100%
	Set range	20—200%		
F5.13	DO1 gain		Factory default	100%
	Set range	20—200%		
F5.12	Reserved			
F5.14	Reserved			

You can change the measurement range or calibrate error of AOV and DO1 outputs by adjusting the output gain.

F5.15	Frequency input channel combination	Factory default	000
	Set range	000—666	

LED first bit: Operation 1
0: Keypad otentiometer setting
1: Digital setting 1
2: Reserved
3: Serial port setting
4: VCI
5: CCI
6: Terminal pulse
LED second bit: Operation 2
0: Keypad otentiometer setting
1: Digital setting 1

2: Reserved
3: Serial port setting
4: VCI
5: CCI
6: Terminal pulse
LED third bit: Operation 3
0: Keypad otentiometer setting
1: Digital setting 1
2: Reserved
3: Serial port setting
4: VCI
5: CCI
6: Terminal pulse
LED forth bit: Reserved

F5.16	Combination given of arithmetic setting		Factory default	00
	Set range	00—54		

LED first bit: Arithmetic 1
0: Add
1: Subtract
2: Absolute value (subtration)
3: Take maximum
4: Take minimum
LED second bit: Arithmetic 2
0: Add
1: Subtract
2: Absolute value (subtration)
3: Take maximum
4: Take minimum
5: Operation 3 not take part in operation
LED third bit: Reserved
LED forth bit: Reserved

5.7 PID control parameter

Analog feedback control system: Input pressure specified quantity by VCI port, transmit 4~20mA feedback value of pressure sensor to CCI port of, to from an analog closed-loop control system through built-in PID controller.

F6.00	PID action setting		Factory default	00
	Set range	00-11		

LED first bit: Function setting

0: Close

1: Open

LED second bit: PID jump-in selection

0: Auto jump-in

1: Manual jump-in

LED third bit: Reserved

LED forth bit: Reserved

F6.01	PID provision channel selection			Factory default	1
F6.02	PID feedback channel selection			Factory default	4
	Set range	0	Keypad otentiometer setting		
		1	Digital setting		
		2	Reserved		
		3	Reserved		
		4	VCI		
		5	CCI		
		6	Terminal pulse		
		7	VCI+CCI		
		8	VCI-CCI		
		9	MIN｛VCI,CCI｝		
		10	MAX｛VCI,CCI｝		

F6.03	Digital setting of specified quantity		Factory default	0.00V
	Set range	0.00—10.00V		

When analog feedback is selected (F6.01=1), this function allows parameter setting from keypad or serial port.

F6.04	Feedback channel gain		Factory default	1.00V
	Set range	0.01—10.00		
F6.05	Feedback channel polarity		Factory default	0
	Set range	0	Positive	
		1	Negative	
F6.06	Proportional gain P		Factory default	1.00
	Set range	0.01—10.00		
F6.07	Integral time Ti		Factory default	1.00s
	Set range	0.1—200.0s		
F6.08	Differential time Td		Factory default	0.0s
	Set range	0.0—10.0s		

Optimize the responsiveness by adjusting these parameters while driving an actual load.

Use the following procedure to activate PID control and then adjust it while monitoring the response.

1. Enabled PID control.
2. Increase the proportional gain (P) as far as possible without creating oscillation.
3. Reduce the integral time (Ti) as far as possible without creating oscillation.
4. Increase the differential time (Td) as far as possible without creating oscillation.

F6.09	Sampling cycle T		Factory default	0.00s
	Set range	0.00—10.00s		

Sampling cycle T refers to the sampling cycle of feedback value. The PI regulator calculates once in each sampling cycle. The bigger the sampling cycle, the slower the response is.

F6.10	Bias limit		Factory default	0.0%
	Set range	0.0—20.0%		

Bias limit defines the maximum bias between the feedback and the preset. PID stops operation when the bias is within this range. Setting this parameter correctly is helpful to improve the system output accuracy and stability.

F6.11	Closed-loop preset frequency		Factory default	0.00Hz
	Set range	0.0-upper limit frequency		
F6.12	Preset frequency hold time		Factory default	0.0s
	Set range	0.0—6000.0s		

The above parameters are helpful for the close-loop control to enter stable state quickly.

After close-loop running is started, the drive will accelerate to the preset frequency F6.11 within the accelerate time, and hold the frequency for a period of time (F6.12), and then run according to close-loop characteristic.

If you don't need preset frequency, just set F6.11 and F6.11 at 0.

F6.13	Sleep threshold		Factory default	10.00V
	Set range	0.0—10.00V		
F6.14	Revival threshold		Factory default	0.00V
	Set range	0.0—10.00V		

Sleep threshold define feedback value limit from work status to sleep status. If set feedback value is smaller than this limit and the situation sustains for a sleep delay time, the inverter will enter into sleep status from work status.

Revival threshold define feedback value limit from sleep status to work status. If set feedback value is bigger than this limit and the situation sustain for a revival delay time, the inverter will enter into work status from sleep status.

5.8 Programmable running parameter

F7.00	Programmable running control		Factory default	000
	Set range	000-114		

LED first bit: Run mode selection
0: No action
1: Single cycle
2: Continuous cycle
3: Maintain value of the last stage after 1 cycle
4: Traverse run
LED second bit: Programmable multi-speed (PLC) run jump-in
0: Auto jump-in
1: Manual jump-in
LED third bit: Traverse run jump-in
0: Auto jump-in
1: Manual jump-in
LED forth bit: Reserved
1: Single cycle
The drive stops after a single cycle automatically. It will start given another Run command.
2: Continuous cycle
The drive continues running cycle after cycle until stop command is received.
3: Maintain value of the last stage after 1 cycle
The drive holds the frequency and direction of the last stage after single cycle.

F7.01	Phase 1 run time	Factory default	10.0s
F7.02	Phase 2 run time	Factory default	10.0s
F7.03	Phase 3 run time	Factory default	10.0s
F7.04	Phase 4 run time	Factory default	10.0s
F7.05	Phase 5 run time	Factory default	10.0s
F7.06	Phase 6 run time	Factory default	10.0s
F7.07	Phase 7 run time	Factory default	10.0s
F7.08	Reserved		
	Set range	0.0—6000.0s	
F7.09	Multi-phase run direction 1	Factory default	0000
F7.10	Multi-phase run direction 2	Factory default	000

	Set range	0000—1111(0: Forward 1: Reverse)

F7.01~F7.10 are to set frequency, direction, Acc/Dec time of PLC stages.
When the PLC operating direction is determined by operating commands, the motor's operating direction can be changed by external command. For example, running forward can be ordered by terminal FWD-COM. The direction is decided by running command and if it cannot be determined, the drive will runs in the direction of last operating stage.

F7.11	Traverse operation control mode	Factory default	000
	Set range	0000—111	

LED first bit: Reserved
LED second bit: Traverse control
0: Fixed Traverse amplitude
1: Changing wobble amplitude
LED third bit: Stopping mode of traverse operation
0: Start as earlier state
1: Restart
LED forth bit: Save parameters upon power-off
0: Save
1: Not save

F7.12	Traverse preset frequency	Factory default	10.00Hz
	Set range	0.00Hz—upper limit frequency	
F7.13	Waiting time before traverse	Factory default	0.0s
	Set range	0.0—3600.0s	

F7.12 defines the frequency before entering traverse state.
When the traverse start, F7.13 specifies the time period that the drive run at preset traverse frequency.

F7.14	Traverse amplitude	Factory default	10.0%
	Set range	0.0—50.0%	

Varied amplitude: AW=central frequency×F7.14
Fixed amplitude: AW=max. frequency F0.06×F7.14

F7.15	Step frequency		Factory default	0.0%
	Set range	0.0—50.0%		

If it is set at 0, then there will be no step frequency.
Practical step frequency =F7.15×F7.14

F7.16	Traverse cycle		Factory default	10.0s
	Set range	0.1—3600.0s		

It defines the period of traverse operation including rising time and falling time.
Note:
Under traverse mode, auto Acc/Dec is not allowed, otherwise, the traverse cycle will become abnormal.

F7.17	Rising time of triangle wave		Factory default	50.0%
	Set range	0.0—100.0%		

It defines the rising time of traverse operation that equals to F7.16×F7.17 (s) and falling time, F7.16×(1-F7.17) (s)

F7.18	Traverse central frequency		Factory default	10.00Hz
	Set range	0.00—upper limit frequency		

The central frequency of traverse operation is default as present reference frequency.
The traverse setting becomes invalid for close-loop and jog.

5.9 Communication parameter

F8.00	Local address		Factory default	1
	Set range	0—31		

This parameter is used to identify the address when the serial port communicates. When this parameter is set to 0, this inverter is used as master when serial port communicates, to control the running of other connected inverters.
When this parameter is set to 1~31, this inverter is used as slave to receive the date from upper machine or master.

F8.01	Communication setting		Factory default	013
	Set range	0000—0025		

LED first bit: Baud rate option
0: 1200BPS
1: 2400BPS
2: 4800BPS
3: 9600BPS
4: 19200BPS
5: 38400BPS
LED second bit: Data format
0: No checkout
1: Even checkout
2: Odd checkout
LED third bit: Communication failure motion
0: Stop
1: Stand
LED forth bit: Reserved
This parameter sets the communication mode.

F8.02	Communicate timeout detect		Factory default	10.0s
	Set range	0.0-100.0s		

When the communication signal is lost for a period longer than the setting of this parameter, the drive deems that communication fault occurs.
When it is set at 0, the drive will not detect the communication status.

F8.03	Response delay		Factory default	5ms
	Set range	0-1000ms		

Response delay refers to the time from the drive receiving and executing the command of the host to returning reply frame to the host.

F8.04	Setting scale		Factory default	1.00
	Set range	0.01-10.00		

5.10 Protection function parameter

F9.00	Motor overload protection factor		Factory default	105%
	Set range	30%—110%		

In order to apply effective overload protection to different kinds of motors, the Max output current of the drive should be adjusted.
The efficient is calculated by the formula below:
Motor overload protection coefficient= motor rated current / inverter's rated output current×100%
Generally, the Max load current is the motor's rated current.
If the motor's rated current does not match that of the drive, adjust F9.00 to perform overload protection.

F9.01	Under voltage protection level		Factory default	200V / 400V
	Set range	180—240V / 360V—480V		
F9.02	Overvolltage limit level		Factory default	350V / 700V
	Set range	330—380V / 660—760V		

F9.03	Current limit level		Factory default	180%
	Set range	120%—220%		

Current limit function is used to limit the load current under the preset current in real time to avoid trip due to over-current. This function is especially useful for the applications of larger load inertia or sharp change of load.
F9.03 defines the level for current limit. Its setting is a percentage of drive's rated current Ie.

5.11 Advanced function parameter

FA.00	Zero-frequency run threshold		Factory default	0.00Hz
	Set range	0.00—50.00Hz		
FA.01	Zero-frequency hysteresis		Factory default	0.00Hz
	Set range	0.00—50.00Hz		

The above two parameters are to set zero frequency hysteresis control.

This function can realize dormancy to save energy. In addition, the frequent start and stop at threshold frequency can be avoided.

FA.02	Dynamic braking initial voltage		Factory default	350 / 700V
	Set range	300—360V / 600—720V		
FA.03	Dynamic braking motion rate		Factory default	50%
	Set range	10—100%		

The max. continuous dynamic braking time is calculated with 100s as a cycle.
The resistance and power of the braking resistor should be considered.

FA.04	Cooling fan control selection		Factory default	0
	Set range	0	Auto running mode	
		1	Run all the time	

FA.05	UP/DOWN terminal speed limit setting		Factory default	1.00Hz/S
	Set range	0.01Hz～100.0Hz/S		

To define the increase / decrease rate when using UP/DOWN terminal to change reference frequency.

FA.06	Overshoot enabled		Factory default	0
	Set range	0	Disabled	
		1	Enabled	

When the electric network voltage is much lower (under 15% of rated voltage) or the drive works with a heavy load for long time, it will boost its bus voltage usage rate to increase output voltage.
0: Disabled
1: Enabled

6 Function parameter table

6.1 Function parameter schedule graph

Notice: X---parameter can't be changed in process of running
O---parameter can be changed in process of running

Basic parameter F0					
Function code	Name	Set range	Unit	Factory default	Modify
F0.00	Control mode	0: Sensorless vector control (SVC) 1: V/F control	1	1	X
F0.01	Frequency input channel selection	0: Keypad otentiometer setting 1: Digital setting 1, keypad 2: Digital setting 2, terminal UP/ DOWN adjust setting 3: Digital setting, serial port setting 4: VCI analog setting (VCI-GND) 5: CCI analog setting (CCI-GND) 6: Terminal pulse（0～10KHZ） 7: Combination setting 8: Outer terminal	1	0	O
F0.02	Digital frequency control	LED first bit: Save upon power-off 0: Save 1: Not save LED second bit: Hold after stop 0: Hold 1: Not hold LED third bit: Save LED fourth bit: Save	1	00	O
F0.03	Frequency digital seeting	0.00～upper limit Freq.	0.01Hz	50.00Hz	O
F0.04	Run command channel selection	0: Keypad run control 1: Terminal run command control 2: Serial port run command control	1	0	O
F0.05	Run direction setting	0: Forward run 1: Reverse run 2: Prevent reversing	1	0	O
F0.06	Upper limit Freq.	MAX{F0.07，0.10Hz}~400.00Hz	0.01Hz	50.00Hz	X
F0.07	Lower limit Freq.	0.00~【F0.06】	0.01Hz	00.00Hz	X
F0.08	Basic run Freq.	1.00~Upper limit Frequency	0.01Hz	50.00Hz	X
F0.09	Max output	380V: 200~500V	1	380V	X

	voltage	220V: 100~250V		220V	
F0.10	G/P option	0: G type 1: P type	1	0	X
F0.11	Torque boost mode	0: Manual boost 1: Automatic boost	1	0	X
F0.12	Torque boost	0.0～30.0%	0.1		O
F0.13	Slip frequency compensation	0.0～150.0%	0.1	0.0	O
F0.14	Acc time 1	0.1～3600	0.1	Depend on model	O
F0.15	Dec time 1		0.1	Depend on model	O
F0.16	V/F curve setting	0: Constant torque curve 1: Degressive torque curve 1 (the 1.7th power) 2: Degressive torque curve 2 (the 2th power) 3: End-user sets V/F curve himself (determined by F0.17～F0.22)	1	0	X
F0.17	V/F Frequency value F1	0.00～Freq. value F2	0.01Hz	12.50Hz	X
F0.18	V/F Valtage value V1	0.0～Valt. value V2	0.1%	25.0%	X
F0.19	V/F Frequency value F2	Freq. value F1～Freq. value F3	0.01Hz	25.00Hz	X
F0.20	V/F Valtage value V2	Valt. value V1～Valt. value V3	0.1%	50.0%	X
F0.21	V/F Frequency value F3	Freq. value F2～basic run Freq.	0.01Hz	37.50Hz	X
F0.22	V/F Valtage value V3	Valtage value V2～100.0%	0.1%	75.0%	X
F0.23	REV/JOG	0：REV 1：JOG	1	1	O

Motor and vector control parameters F1

Function code	Name	Set range	Unit	Factory default	Modify
F1.00	Motor rated voltage	380V：200～500V 220V：100～250V	1V	380V 220V	O
F1.01	Motor rated current	0.1～500.0A	0.1A	Depend on model	O
F1.02	Motor rated speed	300～6000RPM	1RPM	Depend on	X

				model	
F1.03	Motor rated Freq.	1.00～400.00Hz	0.01Hz	50.00Hz	X
F1.04	Current without load	0.1～500.0A	0.1A	Depend on model	O
F1.05	Motor stator resistance	0.001～10.000Ω	0.001Ω	Depend on model	X
F1.06	Motor rotor resistance	0.001～10.000Ω	0.001Ω	Depend on model	X
F1.07	Motor leakage inductance	0.01～600.00mH	0.01mH	Depend on model	X
F1.08	Motor mutual inductance	0.01～600.00mH	0.01mH	Depend on model	X
F1.09	Reserved				
F1.10	Slip compensation rate	0.50-2.00	0.01	1.00	O
F1.11	Pre-excitation selection	0: Valid under certain condition 1: Permanently invalid	1	0	X
F1.12	Pre-excitation time	0.1～10S	0.1	0.2S	X
F1.13	Motor parameters autotuning	0: No action 1: Static autotuning	1	0	X
F1.14	ASR proportional gain Kp	0.01～5.00	0.01	1.00	O
F1.15	ASR integral time Ki	0.01～10.00S	0.01S	2.00S	O
Auxiliary parameter F2					
Function code	Name	Set range	Unit	Factory default	Modify
F2.00	Starting way	0: Start from start frequency 1: Speed tracking start	1	0	X
F2.01	Starting Freq.	0.00～10.00Hz	0.01Hz	1.00Hz	O
F2.02	Starting Freq. duration	0.0～10.0s	0.1s	0.0s	X
F2.03	DC brake current at starting	0.0～100.0%	0.1%	0.0%	O
F2.04	DC brake time at starting	0.0: No action 0.1～30.0s	0.1s	0.0s	X
F2.05	Acc./Dec. mode selection	0: Linear Acc./Dcc. Mode 1: S curve Acc./Dec. mode	1	0	O

F2.06	Time of S curve's start part	10.0～40.0%	0.1%	20.0%	X
F2.07	Time of S curve's up/down part	10.0～80.0%	0.1%	60.0%	X
F2.08	AVR function	0: No action 1: Action	1	1	X
F2.09	Automatic energy-saving run	0: No action 1: Action	1	0	X
F2.10	FWD/REV dead time	0.1～10.0s	0.1s	0.0s	X
F2.11	Stop mode	0: Decelerating and stopping 1: Coast to stop	1	0	X
F2.12	Initial freq. of DC injection braking	0.00～20.00Hz	0.01Hz	0.00Hz	O
F2.13	DC injection braking current	0.0～100.0%	0.1%	0.0%	O
F2.14	DC injection braking time	0.0: DC braking no action 0.1～30.0s	0.1s	0.0s	X
F2.15	Restart after power failure	0: No action 1: Action 2: Speed tracking start	1	0	X
F2.16	Delay time for restarting after power failure	0.0～20.0s	0.1s	0.5s	X
F2.17	Failure self-reset times	0～10	1	0	X
F2.18	Failure self-reset interval	0.5～25.0s	0.1	3.0s	X
F2.19	Jog run frequency	0.00～50.00Hz	0.01Hz	10.00Hz	O
F2.20	Jog Acc.time	0.1～3600	0.1s	Depend on model	O
F2.21	Jog Dec. time		0.1s	Depend on model	O
F2.22	Acc. time 2	0.1～3600	0.1s	Depend on model	O
F2.23	Dec. time 2		0.1s	Depend on model	O
F2.24	Acc. time 3	0.1～3600	0.1s	Depend on model	O
F2.25	Dec. time 3		0.1s	Depend on model	O
F2.26	Acc. time 4	0.1～3600	0.1s	Depend on	O

				model	
F2.27	Dec. time 4		0.1s	Depend on model	O
F2.28	Multi-frequency 1	0.00～Upper limit frequency	0.01Hz	5.00Hz	O
F2.29	Multi-frequency 2	0.00～Upper limit frequency	0.01Hz	10.00Hz	O
F2.30	Multi-frequency 3	0.00～Upper limit frequency	0.01Hz	15.00Hz	O
F2.31	Multi-frequency 4	0.00～Upper limit frequency	0.01Hz	20.00Hz	O
F2.32	Multi-frequency 5	0.00～Upper limit frequency	0.01Hz	25.00Hz	O
F2.33	Multi-frequency 6	0.00～Upper limit frequency	0.01Hz	30.00Hz	O
F2.34	Multi-frequency 7	0.00～Upper limit frequency	0.01Hz	40.00Hz	O
F2.35	Reserved				
F2.36	Kick Freq. 1	0.00～Upper limit frequency	0.01Hz	0.00Hz	O
F2.37	Kick range 1	0.0～10.0Hz	0.01Hz	0.00Hz	O
F2.38	Kick Freq. 2	0.0～Upper limit frequency	0.01Hz	0.00Hz	O
F2.39	Kick range 2	0.0～10.0Hz	0.01Hz	0.00Hz	O
F2.40	Kick Freq. 3	0.0～Upper limit frequency	0.01Hz	0.00Hz	O
F2.41	Kick range 3	0.0～10.0Hz	0.01Hz	0.00Hz	O
F2.42	Carrier Freq. regulation	1.0～12.0KHz	0.1Hz	Depend on model	O
F2.43	Carrier control mode	0: Settled carrier 1: Automatic carrier adjusting	1	1	O

User's management parameter F3

Function code	Name	Set range	Unit	Factory default	Modify
F3.00	LCD language	0: Chinese 1: English	1	0	Oo
F3.01	Parameter initialization	0: No action 1: Restore factory default 2: Clear fault records	1	0	X
F3.02	Parameter write protection	0: All parameters are allowed to be modified 1: Except frequency, others are not allowed to be modified 2: Parameters are forbidden to overwrite expect this parameter	1	0	O
F3.03	Manufacturer parameter	0～9999	1	0	O
F3.04	LED 1 display	0～18（as follows）	1	0	O
F3.05	LCD 2 display	0: Output frequency (Hz)	1	1	O

		1: Setting frequency (Hz) 2: Output current (A) 3: Output voltage (V) 4: Load motor speed (RPM/min) 5: Running linear speed (m/s) 6: Set linear speed (m/s) 7: Bus voltage (V) 8: Input AC power voltage (V) 9: Set PID value 10: Feedback PID value 11: Analog input VCI (V) 12: Analog input CCI (A) 13: Pulse input frequency (KHz) 14: Input terminal state 15: Heatsink temperature (℃) 16: Module temperature (℃) 17: Current count value 18: Setting count value			
F3.06	Linear speed coefficient	0.01～100.0	0.01	1.00	O
F3.07	Closed-loop display coefficient	0.01～100.0	0.01	1.00	O
F3.08	Sofeware version	0～99.99	0.01		X
F3.09	Unit of Acc/Dec time	0: Second 1: Minute	1	0	O

Digital input and output parameterF4

Function code	Name	Set range	Unit	Factory default	Modify
F4.00	Input terminal X1	0: Leave control terminal unused 1: Multi-speed selection 1 2: Multi-speed selection 2 3: Multi-speed selection 3 4: Acc/Dec time 1 5: Acc/Dec time 2 6: Frequency channel selection 1 7: Frequency channel selection 2 8: Frequency channel selection 3 9: Forward jog control 10: Reverse jog control 11: Free stop control 12: Freq. increasing command	1	0	X
F4.01	Input terminal X2		1	0	X
F4.02	Input terminal X3		1	0	X
F4.03	Input terminal X4		1	0	X
F4.04	Input terminal X5		1	0	X
F4.05	Input terminal X6		1	0	X

		13: Freq. decreasing command 14: External device failure input 15: Three-line run control 16: DC brake order 17: Clear counter and input 18: Counter triggering signal input 19: Pulse frequency input 20: External reset input (RESET) 21: Frequency of UP/DOWN terminal clear 22: PID running jump-in 23: Programmable multi-speed running 24: Run traverse operation jump-in 25: Reset traverse operation 26: External stop order 27: Drive operation prohibiting 28: Acc/Dec prohibit 29: Terminal control mode is enabled 30: Frequency reference is input via terminal CCI 31: Reserved			
F4.06	FWD/REV terminal control mode	0: Two-line control mode 1 1: Two-line control mode 2 2: Three-line control mode 1 3: Three-line control mode 2	1	0	X
F4.07	Open collector output terminal Y1 setting	0: Drive running signal 1: Frequency arriving signal 2: Frequency level detect signal 3: Inverter zero speed indication 4: External failure stop-running 5: Output freq. reach upper limit 6: Output freq. reach lower limit 7: Completion of simple PLC operation stages 8: Overload alarming signal 9: Ready 10: Counter detect signal output 11: Counter reset signal output 12: Inverter failure	1	0	O
F4.08	Open collector output terminal Y2 setting		1	1	O
F4.09	Programmable Relay output TA TB TC terminal		1	12	O

		13: Low voltage lock-up signal 14: Upper and lower limits of traverse frequency 15: PLC cycle completion indication			
F4.10	FDT level setting	0.00Hz～Upper limit frequency	0.01Hz	10.00Hz	O
F4.11	FDT lag	0.0～30.00Hz	0.1Hz	1.00Hz	O
F4.12	Freq. checkout scope (FAR)	0.00Hz～15.0Hz	0.01Hz	5.00Hz	O
F4.13	Overload detection threshold	20～120%	1%	100%	O
F4.14	Overload alarm delay	0.0～15.0s	0.1s	1.0s	X
F4.15	Preset counting value	【F4.16】～60000	1	1	X
F4.16	Specified counting value	0～【F4.15】	1	1	X

Analog input output parameter F5

Function code	Name	Set range	Unit	Factory default	Modify
F5.00	VCI input lower-limit voltage	0.0～【F5.01】	0.1V	0.0V	O
F5.01	VCI input upper-limit voltage	【F5.00】～10.0V	0.1V	10.0V	O
F5.02	CCI input lower-limit current	0.0～【F5.03】	0.1mA	0.0mA	O
F5.03	CCI input upper-limit current	【F5.02】～20.0mA	0.1mA	20.0mA	O
F5.04	External pulse input lower limit frequency	0.0～【F5.05】	0.1KHz	0.0KHz	O
F5.05	External pulse input upper limit frequency	【F5.04】～20.0kHz	0.1KHz	10.0KHz	O
F5.06	Set frequency corresponding to min. analog input	0.0Hz～Upper limit frequency	0.01Hz	0.00Hz	O
F5.07	Set frequency corresponding to	0.0Hz～Upper limit frequency	0.01Hz	50.00Hz	O

	max analog input				
F5.08	Delay time of analog input signal	0.1～5.0s	0.1s	0.5s	O
F5.09	AOV analog output selection	0: Output frequency 1: Setting frequency 2: Output current 3: Load motor speed 4: Output voltage 5: Bus-bar voltage 6: PID provision 7: PID feedback	1	0	O
F5.10	DO1 pulse output selection		1	2	O
F5.11	AOV gain	20～200%	1%	100%	O
F5.12	Reserved				O
F5.13	DO1 gain	20～200%	1%	100%	O
F5.14	Reserved				O
F5.15	Frequency input channel combination	LED first bit: Operation 1 0: Keypad otentiometer setting 1: Digital setting 1 2: Reserved 3: Serial port setting 4: VCI 5: CCI 6: Terminal pulse LED second bit: Operation 2 0: Keypad otentiometer setting 1: Digital setting 1 2: Reserved 3: Serial port setting 4: VCI 5: CCI 6: Terminal pulse LED third bit: Operation 3 0: Keypad otentiometer setting 1: Digital setting 1 2: Reserved 3: Serial port setting 4: VCI 5: CCI 6: Terminal pulse LED forth bit: Reserved	1	000	X
F5.16	Combination given of arithmetic	LED first bit: Arithmetic 1 0: Add	1	00	O

	setting	1: Subtract 2: Absolute value (subtration) 3: Take maximum 4: Take minimum LED second bit: Arithmetic 2 0: Add 1: Subtract 2: Absolute value (subtration) 3: Take maximum 4: Take minimum 5: Operation 3 not take part in operation LED third bit: Reserved LED forth bit: Reserved			

PID control parameter F6

Function code	Name	Set range	Unit	Factory default	Modify
F6.00	PID action setting	LED first bit: Function setting 0: Close 1: Open LED second bit: PID jump-in selection 0: Auto jump-in 1: Manual jump-in LED third bit: Reserved LED forth bit: Reserved	1	00	X
F6.01	PID provision channel selection	0: Keypad otentiometer setting 1: Digital setting 2: Reserved 3: Reserved 4: VCI 5: CCI 6: Terminal pulse 7: VCI+CCI 8: VCI-CCI 9: MIN｛VCI,CCI｝ 10:MAX｛VCI,CCI｝	1	1	X
F6.02	PID feedback channel selection		1	4	X
F6.03	Digital setting of specified quantity	0.00～10.00V	0.01V	0.00V	O
F6.04	Feedback channel gain	0.01～10.00	0.01	1.00	O

F6.05	Feedback channel polarity	0: Positive 1: Negative	1	0	X
F6.06	Proportional gain	0.01～10.00	0.01	1.00	O
F6.07	Integral time	0.1～200.0s	0.1s	1.0s	O
F6.08	Differential time	0.0: No differential 0.1～10.0s	0.1s	0.0s	O
F6.09	Sampling cycle	0.00: Auto 0.01～10.00s	0.01s	0.00s	O
F6.10	Bias limit	0.0～20.0%	0.1%	0.0%	O
F6.11	Closed-loop preset frequency	0.0～Upper limit frequency	0.01Hz	0.00Hz	O
F6.12	Preset frequency hold time	0.0～6000.0s	0.1s	0.0s	X
F6.13	Sleep threshold	0.0～10.00V	0.01	10.00V	O
F6.14	Revival threshold	0.0～10.00V	0.01	0.00V	O

Programmable running parameter F7

Function code	Name	Set range	Unit	Factory default	Modify
F7.00	Programmable running control	LED first bit: Run mode selection 0: No action 1: Single cycle 2: Continuous cycle 3: Maintain value of the last stage after 1 cycle 4: Traverse run LED second bit: Programmable multi-speed (PLC) run jump-in 0: Auto jump-in 1: Manual jump-in LED third bit: Traverse run jump-in 0: Auto jump-in 1: Manual jump-in LED forth bit: Reserved	1	000	X
F7.01	Phase 1 run time	0.0～6000.0s	0.1s	10.0s	O
F7.02	Phase 2 run time	0.0～6000.0s	0.1s	10.0s	O
F7.03	Phase 3 run time	0.0～6000.0s	0.1s	10.0s	O
F7.04	Phase 4 run time	0.0～6000.0s	0.1s	10.0s	O
F7.05	Phase 5 run time	0.0～6000.0s	0.1s	10.0s	O
F7.06	Phase 6 run time	0.0～6000.0s	0.1s	10.0s	O
F7.07	Phase 7 run time	0.0～6000.0s	0.1s	10.0s	O

F7.08	Reserved				
F7.09	Multi-phase run direction 1	LED first bit: Phase 1 direction 0: Forward 1: Reverse LED second bit: Phase 2 direction 0: Forward 1: Reverse LED third bit: Phase 3 direction 0: Forward 1: Reverse LED forth bit: Phase 4 direction 0: Forward 1: Reverse	1	0000	O
F7.10	Multi-phase run direction 2	LED first bit: Phase 5 direction 0: Forward 1: Reverse LED second bit: Phase 6 direction 0: Forward 1: Reverse LED third bit: Phase 7 direction 0: Forward 1: Reverse LED forth bit: Reserved	1	000	O
F7.11	Traverse operation control mode	LED first bit: Reserved LED second bit: Traverse control 0: Fixed Traverse amplitude 1: Changing wobble amplitude LED third bit: Stopping mode of traverse operation 0: Start as earlier state 1: Restart LED forth bit: Save parameters upon power-off 0: Save 1: Not save	1	000	X
F7.12	Traverse preset frequency	0.00Hz～Upper limit frequency	0.01Hz	10.00Hz	O
F7.13	Waiting time before traverse	0.0～3600.0s	0.1s	0.0s	X
F7.14	Traverse amplitude	0.0～50.0%	0.1%	10.0%	O
F7.15	Step frequency	0.0～50.0%	0.1%	10.0%	O
F7.16	Traverse cycle	0.1～3600.0s	0.1s	10.0s	O
F7.17	Rising time of triangle wave	0.0～100.0%	0.1%	50.0%	O
F7.18	Traverse central frequency	0.00Hz～Upper limit frequency	0.01Hz	10.00Hz	O
Communication parameter F8					

Function code	Name	Set range	Unit	Factory default	Modify
F8.00	Local address	0: Host 1～31: Slave	1	1	X
F8.01	Communication setting	LED first bit: Baud rate option 0: 1200BPS 1: 2400BPS 2: 4800BPS 3: 9600BPS 4: 19200BPS 5: 38400BPS LED second bit: Data format 0: No checkout 1: Even checkout 2: Odd checkout LED third bit: Communication failure motion 0: Stop 1: Stand LED forth bit: Reserved	1	013	X
F8.02	Communicate timeout detect	0.0～100.0s	0.1s	10.0s	X
F8.03	Response delay	0～1000ms	1ms	5ms	X
F8.04	Setting scale	0.01～10.00	0.01	1.00	O

Protection function parameter F9

Function code	Name	Set range	Unit	Factory default	Modify
F9.00	Motor overload protection factor	30%～110%	1%	105%	O
F9.01	Under voltage protection level	180～240V /360～480V	1V	200/400V	O
F9.02	Overvolltage limit level	330～380V /660～760V	1V	350/700V	O
F9.03	Current limit level	120%～220%	1%	180%	O

Advanced function parameter FA

Function code	Name	Set range	Unit	Factory default	modify

FA.00	Zero-frequency run threshold	0.00～50.00Hz	0.01Hz	0.00Hz	O
FA.01	Zero-frequency hysteresis	0.00～50.00Hz	0.01Hz	0.00Hz	O
FA.02	Dynamic braking initial voltage	300～360V /600～720V	1V	350/700V	O
FA.03	Dynamic braking motion rate	10～100%	1%	50%	O
FA.04	Cooling fan control selection	0: Auto running mode 1: Run all the time	1	0	O
FA.05	UP/DOWN terminal speed limit setting	0.01Hz～100.0Hz/S	0.01Hz/S	1.00Hz/S	O
FA.06	Overshoot enabled	0: Disabled 1: Enabled	1	0	X
FA.07	Reserved				
FA.08	Reserved				
FA.09	Reserved				
FA.10	Reserved				
FA.11	Reserved				
FA.12	Reserved				

7 Troubleshooting

7.1 Failure and countermeasure

When the inverter occurs abnormity, LED digitron will display the function code and information about corresponding fault, fault relay will operate and inverter will stop outputting, when the fault occurs, in case that the motor still raotates, it will perform free stop, till it stops rotating. The permissible fault of VF5000 series is shown as table **7-1**，the fault code display range is E-01∽E-20. When finding the fault of inverter, user shall examine according to this table first and record the symptom in detail, and contact our after-sale service center or our sales agencies if need technical service.

7-1Table of fault code and solution

Fault code	Failure type	Possible reason	Countermeasure
E-01	Over current at accelerating operation	①too short accelerating time ②Ultra large load inertia ③Unsuitable V/F curve ④Too small inverter power ⑤ Restart the rotating motor	①Extend accelerating time ②Reduce the load inertia ③Reduce torque boost value or adjust V/F curve ④Choose the inverter of large power ⑤Set the speed-detection start function
E-02	Over current at decelerating operation	①Too short decelerating time ②Ultra large load inertia ③Too small inverter power	①Extend decelerating time ②Reduce the load inertia ③Choose the inverter of large power
E-03	Over current at constant speed operation	①Abnormal input voltage ②Load occurs abrupt change or abnormity ③Too small inverter power	①Examine input power ②Examine load or reduce the abrupt change of large power ③ Choose the inverter of large power
E-04	Over voltage at accelerating operation	①Abnormal input voltage ②Restart the rotating motor	①Examine input power ②Set the speed-detection start function
E-05	Over voltage at decelerating operation	①Too short decelerating time ②There is energy-feedback load ③Abnormal input power supply	①Extend decelerating time ②Add braking power of external energy-consumption braking unit ③Examine input power
E-06	Over voltage at constant speed	①Abnormal input voltage ②Ultra large load inertia	①Examine input power ②Choose energy-consumption

	operation		braking unit
E-07	Over voltage at stopping	①Abnormal input supply voltage	①Examine input supply voltage
E-08	Under voltage at operationg	①Abnormal input voltage	①Examine supply coltage
E-09	Phase failure of input power	①Input power occurs phase failure or abnormity	①Examine input power
E-10	Module fault	①Inverter outputs short circuit or earthes ②Instant over current of inverter ③Too high environment temperature ④Air flue is blocked or fan is damaged ⑤DC auxiliary power supply occurs fault ⑥Abnormal control panel	①Examine the connecting wire ②Refer to solution against over current ③Reduce environment temperature ④Clean the air flue or change the fan ⑤Ask for service from manufacturer or agency
E-11	Over heat radiator	①Too high environment temperature ②Fan is damaged ③Flue is blocked	①Lower environment temperature ②Change the fan ③Clean the flue and change the ventilation condition
E-12	Overload of inverter	①Too high torque boost of unsuitable V/F curve ②Too short accelerating time ③Too large load	①Reduce the torque boost and adjust the V/F curve ②Extend accelerating time ③Reduce load or choose the inverter of large power
E-13	Overload of mortor	①Too high torque boost or unsuitable V/F curve ②Too low main voltage ③Locked rotor of motor or too large abrupt change of load ④Incorrect setting of motor overload protection factor	①Reduce the torque boost value or adjust the V/F curve ②Examine main voltage ③Examine load ④Set the motor overload protection factor correctly
E-14	Fault of external equipment	Fault input terminal ofexternal equipment closes	Open the fault input terminal and remove the fault
E-15	Fault of serial port communication	①Improer setting of baud rate ②False of serial port communication ③Without upper machine	①Set baud rate correctly ②Examine communication cable and ask for service ③Check whether the upper

		communication signal	machine works and the connection is correct
E-16	Reserve		
E-17	Incorrect current detcetion	①The current detecting device is damaged or the circuit occurs fault ②DC auxiliary power is damaged	Ask for service from manufacturer or agency
E-18	Fault of communication between keyboard and control panel	①The circuit connecting keyboard and control panel occurs fault ②The terminal is poor in connecting	① Ask for service ②Examine and reconnect
E-19	System fault	Quite serious inference and false program reading	Ask for service from manufacture or agency
E-20	Reserve		

7.2 Enquiry of fault record

This series of inverters keeps the code of latest four times faults and the inverter operating parameters of the last fault, to help user to enquire these information that is good for finding the fault reason. All fault information is stored in groupD-22 ~D-27 parameters; user can refer to the keyboard operating method to enter into group D for inquiring the required information.

7.3 Fault reset

Please choose following any operation if requiring the fault inverter to recover normal running.

1. When the inverter displays the fault code, you can press

key to reset.
2. When any one terminal of X1~X6 has been set to external RESET input (F4.00 ~F4.04=20), it can break after closing with COM terminal.
3. Cut off power supply

Chapter 8 Maintenance

8.1 Maintenance

In case of change of service environment for inverter, such as temperature, humidity, smog and aging of inverter internal parts, the inverter fault may occur. Therefore, the inverter must be examined daily and given the regular maintenance in period of storing and using.

8.1.1 Daily maintenance

When the inverter is turned on normally, please make sure the following items:

1. Whether the motor has abnormal noise and vibration.
2. Whether inverter and motor heat or occur abnormity.
3. Whether environment temperature is too high.
4. Whether the value of load ammeter is in conformity with the former.
5. Whether the fan of inverter rotates normally.

8.2 Regular maintenance

8.2.1 Regular maintenance

Before the inverter is maintained and checked, the power supply must be cut off, in addition, the monitor shall have no display and main circuit power indicator lamp goes out. The examined content is shown as table 8-1.

Table 8-1 Regular examined contents

Component	Check	Corrective action
Screw of main circuit terminal and control circuit terminal		Tighten.

Heatsink		Blow it away with dry compressed air of 4~6 kg/cm² pressure
PCB printed circuit board		Blow it away with dry compressed air of 4~6 kg/cm² pressure or dry it with the hot air.

Cooling fan		Change the fan

Power unit		Blow it away with dry compressed air of 4~6 kg/cm² pressure
Aluminum electrolytic capacitor		Change the aluminum electrolytic capacitor

8.2.2 Regular maintenance

In order to make the inverter run normally for a long time, the electronic elements mounted in inverter shall be maintained regularly. And the service life of electronic elements is different with the service environment and service condition. The maintenance period of inverter as shown in the table 8-2 is provided for referring.

Table 8-2 Changing time of inverter parts

Part name	Standard changing time
Fan	2～3yeras
Electrolytic capacitor	4～5 yeras
PCB	5～8 yeras
Fuse	10 yeras

Applicable condition for changing time of aforementioned inverter parts

1. Environment temperature: Annual average is 30℃.
2. Load factor: Less than 80%.

3. Running time: Less than 20 huors every day.

8.3 Warranty of inverter

If the inverter has the following situation, we can provide the warranty service.

1. The range of warranty only refers to the body of inverter.

2. When normally used, the inverter occurs fault or is damaged within 12 months, we will be responsible for warranty; if exceeding 12 months. We will charge the reasonable maintenance fee.

3. Within 12 months, if the following situations occur, we also charge the reasonable maintenance fee:

The inverter is damaged for that user doesn’t refer to the operating manual.

The inverter is damaged by reason of flood, fire, abnormity of voltage, etc.

The inverter is damaged by reason of false connection.

The inverter is damsged for that it is used for the abnormal purpose.

4. The relevant service fee is calculated according to actual cost. If a contract has been set, we refer to the contract first for handling.